

ORDER NO.KMS0005497A1

F5

Proprietary Telephone for Electronic Modular Switching System



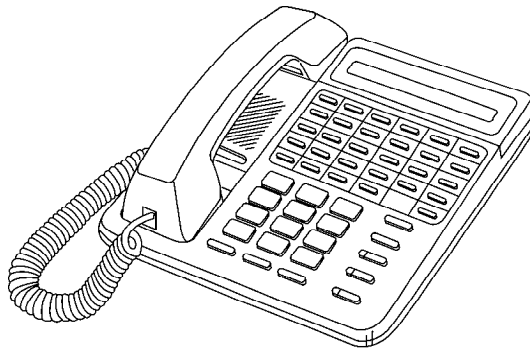
KX-T7135 / KX-T7135B

White Version

Black Version

(for U.S.A.)

Please file and use this manual together with the service manual for Model KX-T7130, Order No.KM49105626C3. This Service Manual indicates the main differences between; Original KX-T7130 and KX-T7135/KX-T7135B.



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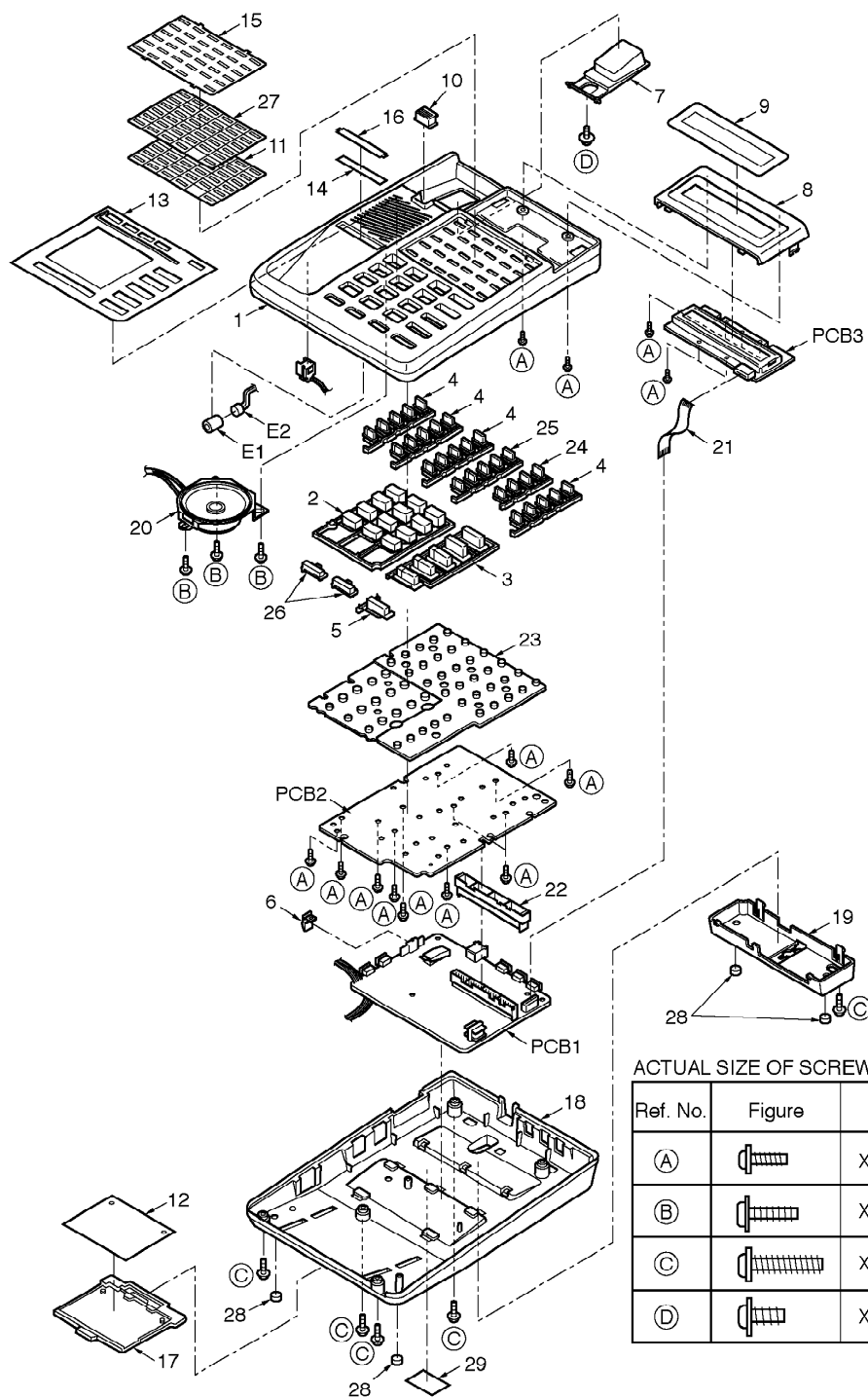
1. PARTS COMPARISON TABLE

(Change from original pages 31~34)

Ref. No.	Part No.		Part Name & Description	Pcs/ Set	Rem
	KX-T7130 (Original)	KX-T7135/ KX-T7135B			
CABINET AND ELECTRICAL PARTS					
1	PQKM209Z8	PQKM209X81	UPPER CABINET (KX-T7135)	1	
1	PQKM209Z8	PQKM209R0	UPPER CABINET (KX-T7135B)	1	
2	PQBCX198Z	PQBCX218Z	BUTTON, 14KEY (KX-T7135)	1	
2	PQBCX198Z	PQBCX218Y	BUTTON, 12KEY (KX-T7135B)	1	
3	PQBCX199Z	PQBCX199Z1	BUTTON, TRANS/PAUSE/AUTO etc. / (KX-T7135)	1	
3	PQBCX199Z	PQBCX199Z2	BUTTON, TRANS/PAUSE/AUTO etc. / (KX-T7135B)	1	
4	PQBCX215Z	PQBCX215Z1	BUTTON, MEMORY-A (KX-T7135)	4	
4	PQBCX215Z	PQBCX215Z2	BUTTON, MEMORY-A (KX- T7135B)	4	
5	PQBC282Z	PQBC282Z1	BUTTON, HOLD (KX-T7135B)	1	
6	PQBD166Y	PQBD166X1	KNOB, VOLUME (KX-T7135)	1	
6	PQBD166Y	PQBD166X2	KNOB, VOLUME (KX-T7135B)	1	
7	PQBE37Z	PQBE37Z1	BUTTON, HOOK (KX-T7135)	1	
7	PQBE37Z	PQBE37Z2	BUTTON, HOOK (KX-T7135B)	1	
8	PQGG91Z	PQGG91Z1	GRILL (KX-T7135)	1	
8	PQGG91Z	PQGG91Z2	GRILL (KX-T7135B)	1	
9	PQGP130Z	PQGP130Z1	LCD PANEL (KX-T7135)	1	
9	PQGP130Z	PQGP130Z2	LCD PANEL (KX-T7135B)	1	
10	PQKE82Z	PQKE82X1	HANGER (KX-T7135)	1	
10	PQKE82Z	PQKE82X2	HANGER (KX-T7135B)	1	
11	PQHP5119Z	PQGD10019Y1	CO LINE SHEET-A (KX-T7135)	1	
11	PQHP5119Z	PQGD10019Y2	CO LINE SHEET-A (KX-T7135B)	1	
13	PQHP5118Z	PQGD10006Z	OVERLAY	1	
14	PQHP532X	PQHP532U	TEL. NO. CARD (SMALL) (KX- T7135B)	1	
15	PQHR5393Z	PQHR5393Y	TEL. NO. CARD (LARGE)	1	
17	PQHR9565Z	PQHR9565Y1	MEMORY CARD COVER (KX- T7135)	1	
17	PQHR9565Z	PQHR9565Y2	MEMORY CARD COVER (KX- T7135B)	1	
18	PQYFT7130X8	PQKF189Z81	LOWER CABINET (KX-T7135)	1	
18	PQYFT7130X8	PQKF189Z0	LOWER CABINET (KX-T7135B)	1	
19	PQYLT7030X8	PQKL37Y81	STAND (KX-T7135)	1	
19	PQYLT7030X8	PQKL37Y0	STAND (KX-T7135B)	1	
24	PQBCX216Y	PQBCX216Y1	BUTTON, MEMORY-B (KX-T7135)	1	
24	PQBCX216Y	PQBCX216Y2	BUTTON, MEMORY-B (KX- T7135B)	1	
25	PQBCX216Z	PQBCX216Z1	BUTTON, MEMORY-C (KX-T7135)	1	

25	PQBCX216Z	PQBCX216Z2	BUTTON, MEMORY-C (KX-T7135B)	1	
26	-----	PQBC10018Z	BUTTON, REDIAL, FLASH (KX-T7135B)	2	Add
27	-----	PQGD10019Z1	CO LINE SHEET-B (KX-T7135)	1	Add
27	-----	PQGD10019Z2	CO LINE SHEET-B (KX-T7135B)	1	Add
28	-----	PQHG316Z	RUBBER, FOOT	4	Add
29	-----	PSGT1987Z	NAME PLATE (KX-T7135)	1	Add
29	-----	PSGT1988Z	NAME PLATE (KX-T7135B)	1	Add
HANDSET PARTS					
H1	PQJX2PYL02Y	PQJX2PS408Z	HANDSET ASS'Y (KX-T7135)	1	
H1	PQJX2PYL02Y	PQJX2PM409Z	HANDSET ASS'Y (KX-T7135B)	1	
H1-1	PQKM211R87	-----	LOWER CABINET	0	Dele
H1-2	PQKF192Y87	-----	UPPER CABINET	0	Dele
H1-3	PQAX4P03Z	-----	SPEAKER	0	Dele
H1-4	PQWMJ2PYL02Y	-----	MICROPHONE ASS'Y	0	Dele
H1-5	PQJJ1TB17X	-----	JACK	0	Dele
H1-6	PQHM32Y	-----	WEIGHT	0	Dele
H1-7	PQHG695W	-----	RUBBER PARTS, CAP	0	Dele
ACCESSORIES AND PACKING MATERIALS					
A1	PQJA214X	PQJA214Y	HANDSET CORD (KX-T7135)	1	
A1	PQJA214X	PQJA214V	HANDSET CORD (KX-T7135B)	1	
A3	PQQX6403Z	PSQX2022Z	USER MANUAL	1	
A4	PQQX6404Z	PSQX1639X	QUICK REFERENCE GUIDE	1	
P1	PQPK1213Z	PSPK1753Z	GIFT BOX (KX-T7135)	1	
P1	PQPK1213Z	PSPK1754Z	GIFT BOX (KX-T7135B)	1	
P2	PQPN1198Z	PQPN1228Y	CUSHION	1	
P4	XZB26X40A01	PQPP170Z	PROTECTION COVER (FOR UNIT)	1	
MAIN BOARD PARTS					
PCB1	PQWP1T7130X	PSWP1T7135MU	MAIN BOARD ASS'Y (RTL) (KX-T7135)	1	
PCB1	PQWP1T7130X	PSWP17135MBU	MAIN BOARD ASS'Y (RTL) (KX-T7135B)	1	
IC10	PQVIUPC358C	PQVINJM2904D	IC	1	
Q2, 3	2SD1819A	2SC4081Q	TRANSISTOR (SI)	2	
Q7	2SD1819A	2SC4081Q	TRANSISTOR (SI)	1	
Q10, 11	2SD1819A	2SC4081Q	TRANSISTOR (SI)	2	
Q12	PQVTDTC143E	PQVTDTC144E	TRANSISTOR (SI)	1	
Q32, 33	2SD1819A	2SC4081Q	TRANSISTOR (SI)	1	
Q35	-----	PQVTDTC144E	TRANSISTOR (SI)	1	Add
Q101	2SB1218A	2SA1576Q	TRANSISTOR (SI)	1	

Q102, 103	2SD1819A	2SC4081Q	TRANSISTOR (SI)	2	
Q110~120	2SD1819A	2SC4081Q	TRANSISTOR (SI)	11	
SW1	PQSS2A27Y	PQSS2A27Z	SWITCH, MEMORY (KX-T7135B)	1	
SW2	PQSS2A27Y	PQSS2A27Z	SWITCH, HANDSET/HEADSET / (KX-T7135B)	1	
SW3	PQSS3A17Y	PQSS3A17Z	SWITCH, CONTRAST (KX-T7135B)	1	
SW4	PQSS3A17Y	PQSS3A17Z	SWITCH, RINGER (KX-T7135B)	1	
SW5	PQSS3A17Y	PQSS3A17Z	SWITCH, HANDSET VOLUME (KX-T7135B)	1	
X2	PQVBT3.58G6	PQVBT3.58G8	CERAMIC FILTER	1	
C4	ECEA0JKS220	ECEA1HKS100	CAPACITOR, 10 μ F S	1	
C61	PQCUV1H223KB	PQCUV1H153KB	CAPACITOR, 0.015 μ F S	1	
C66	PQCUV1H153KB	PQCUV1H333JC	CAPACITOR, 0.033 μ F S	1	
C73	PQCUV1E104MD	PQCUV1E224MD	CAPACITOR, 0.22 μ F	1	
R4	PQ4R10XJ122	PQ4R10XJ102	RESISTOR, 1k Ω	1	
R8	PQ4R10XJ221	PQ4R10XJ101	RESISTOR, 100 Ω	1	
R63	PQ4R10XJ101	PQ4R10XJ121	RESISTOR, 120 Ω	1	
R65	PQ4R10XJ222	PQ4R10XJ152	RESISTOR, 1.5k Ω	1	
R67	PQ4R10XJ471	PQ4R10XJ101	RESISTOR, 100 Ω	1	
R68	PQ4R10XJ682	PQ4R10XJ822	RESISTOR, 8.2k Ω	1	
R69	PQ4R10XJ183	PQ4R10XJ303	RESISTOR, 30k Ω	1	
R72	PQ4R10XJ101	PQ4R10XJ820	RESISTOR, 82 Ω	1	
R79	PQ4R10XJ473	PQ4R10XJ563	RESISTOR, 56k Ω	1	
R80	PQ4R10XJ123	PQ4R10XJ103	RESISTOR, 10k Ω	1	
R89	PQ4R10XJ103	PQ4R10XJ822	RESISTOR, 8.2k Ω	1	
R90	PQ4R10XJ222	PQ4R10XJ822	RESISTOR, 8.2k Ω	1	
R181	PQ4R10XJ272	PQ4R10XJ151	RESISTOR, 150 Ω	1	
R182	PQ4R10XJ182	PQ4R10XJ101	RESISTOR, 100 Ω	1	
R303	-----	PQ4R10XJ000	RESISTOR, 0 Ω	1	Add
J1~44	-----	PQ4R10XJ000	RESISTOR, 0 Ω	44	Add
J50~54	-----	PQ4R18XJ000	RESISTOR, 0 Ω	5	Add
J102	-----	PQ4R18XJ000	RESISTOR, 0 Ω	1	Add
J110	-----	PQ4R18XJ000	RESISTOR, 0 Ω	1	Add
J116	-----	PQ4R18XJ000	RESISTOR, 0 Ω	1	Add
OPERATION BOARD PARTS					
PCB2	PQWP2T7130X	PQWP2T7130MU	OPERATION BOARD ASS'Y (RTL)	1	
J601~618	-----	PQ4R18XJ000	RESISTOR, 0 Ω	18	Add
LCD BOARD PARTS					
PCB3	PQWP3T7130X	PSLP1171Z	LCD BOARD ASS'Y (RTL)	1	



ACTUAL SIZE OF SCREWS

Ref. No.	Figure	Part No.
(A)		XTW26+S8F
(B)		XTW3+S10M
(C)		XTW3+S14P
(D)		XTW3+W6F

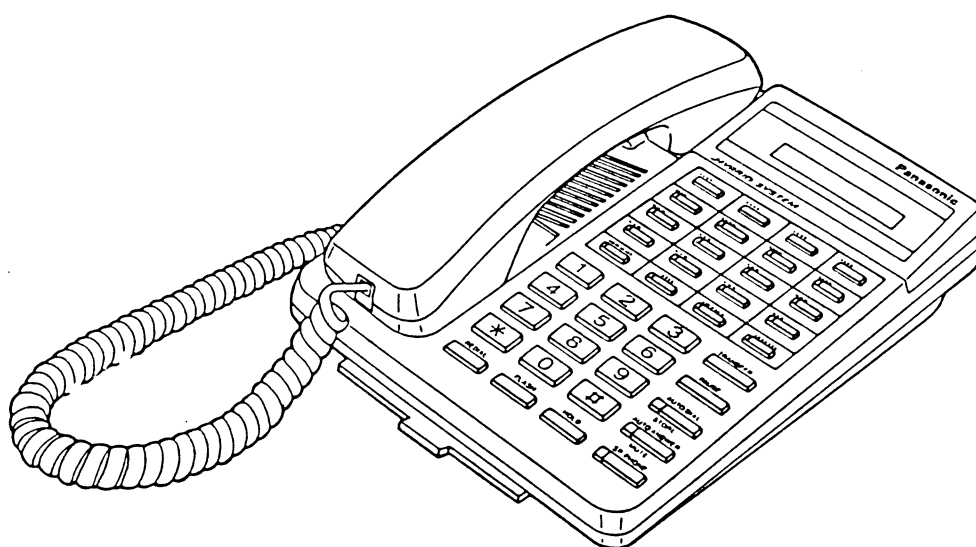
H (Q) KXT7135MUK / KXT7135MBUK / Printed in Japan

Service Manual

and Technical Guide

PROPRIETARY TELEPHONE FOR ELECTRONIC
MODULAR SWITCHING SYSTEM

KX-T7130



■ SPECIFICATIONS

Station Loop Limit:	40 ohms
Cabling Method:	2 pair wire
Jacks:	EMSS, Handset/Headset
Display:	16 digits (max.)
Dimensions:	172 (W)×90 (H)×240 (D) mm with handset (6 ²⁵ / ₃₂ "×3 ¹⁷ / ₃₂ "×9 ⁷ / ₁₆ ")
Weight:	920 g (2 lb 0.45 oz)

Design and specifications are subject to change without notice.

Panasonic

When you mention the serial number, write down the 11 digits. The serial number may be found on the label affixed to the bottom of the unit.

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LOCATION OF CONTROLS

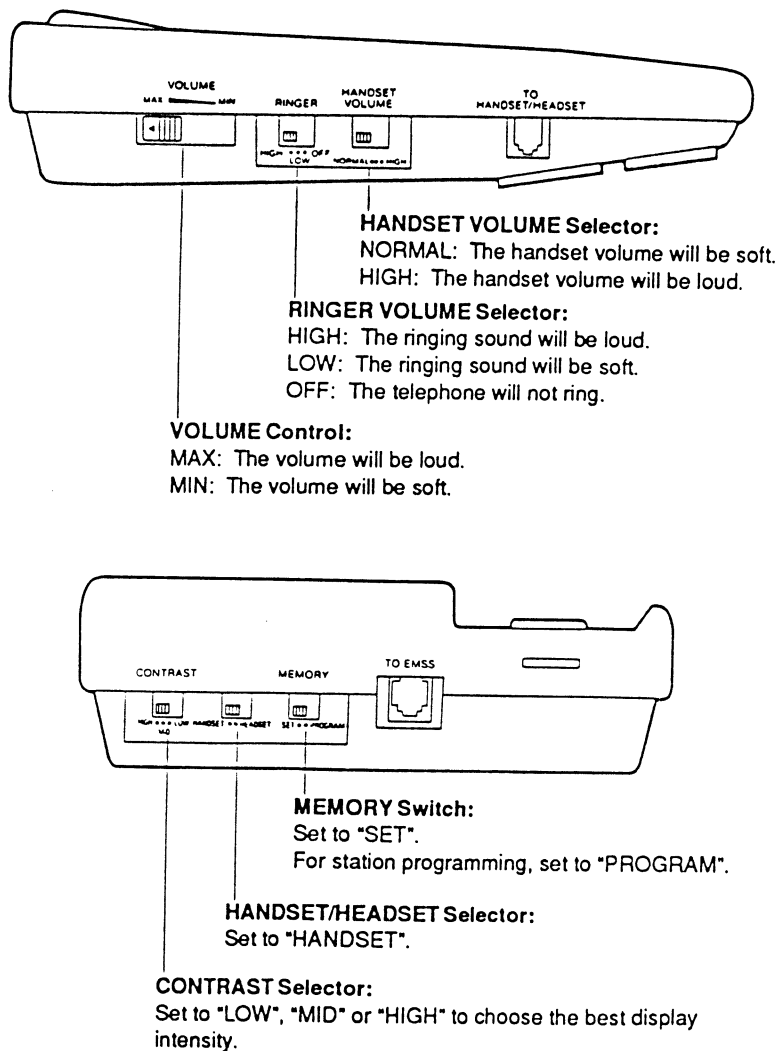
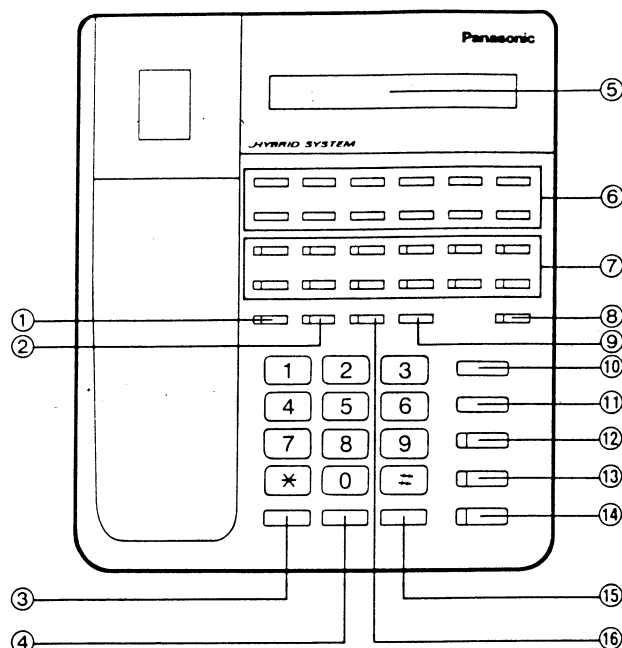


Fig. 1



KX-T7130 is compatible with the Panasonic Electronic Modular Switching Systems and can perform most functions within each systems.

Fig. 2

- ① INTERCOM Button and Indicator:
Used to make or receive an intercom call.
- ② CONFERENCE Button and Indicator:
For talking among three parties.
- ③ REDIAL Button:
For redialing the last dialed number.
- ④ FLASH Button:
For sending the hooking signal to the CO line.
- ⑤ LCD (Liquid Crystal Display)
- ⑥ Programmable Feature Buttons:
For dialing or system feature access with one touch.
- ⑦ Flexible CO Line Buttons and Indicator:
Used for CO line, Direct Station Selection, or Programmable Feature buttons.
This function requires upgraded versions in case of KX-T30810B and KX-T61610B systems.
- ⑧ Flexible Message Waiting Button and Indicator:
Used for Message Waiting, Direct Station Selection, or Programmable Feature button.
This function requires upgraded versions in case of KX-T30810B, KX-T61610B and KX-T123210DB systems.
- ⑨ SAVE Button:
Used to temporarily store the number in the redial memory.
- ⑩ TRANSFER Button:
Used to transfer an outside or an intercom call to any extension.
- ⑪ PAUSE Button:
For pausing during a dialing operation.
- ⑫ AUTO DIAL/STORE Button and Indicator:
For dialing the system speed dialing/For storing an operating procedure into memory.
- ⑬ AUTO ANSWER/MUTE Button and Indicator:
For answering an intercom call automatically/For suspending your voice in hands-free mode.
- ⑭ SP-PHONE Button and Indicator:
Used to make or receive a phone call without using the handset.
- ⑮ HOLD Button:
For placing a call on hold during a conversation.
- ⑯ FWD/DND Button and Indicator:
For setting or canceling the CALL FORWARDING/DO NOT DISTURB feature.

FOR SERVICE TECHNICIANS

Note the following items when exchanging the LEDs (Ref. No. D617~635) of Dial P.C.Board.

1. Do not use LED again which is removed from P.C.Board.
2. Use soldering iron (less than 15 W) for exchanging LED.
3. Do not heat LED more than 2 seconds.
4. Do not move LED after solder.

CONNECTION

Connect as shown.

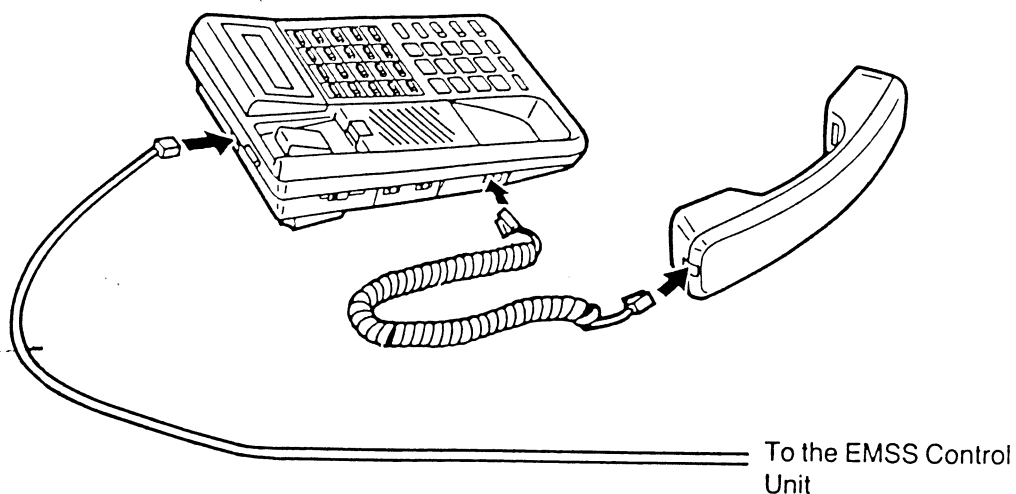


Fig. 3

USING OVERLAY

When the System Program Switch on the EMSS Control Unit is set to the position for programming, the function of the KX-T7130 connected to your EMSS Control Unit will change as follows.

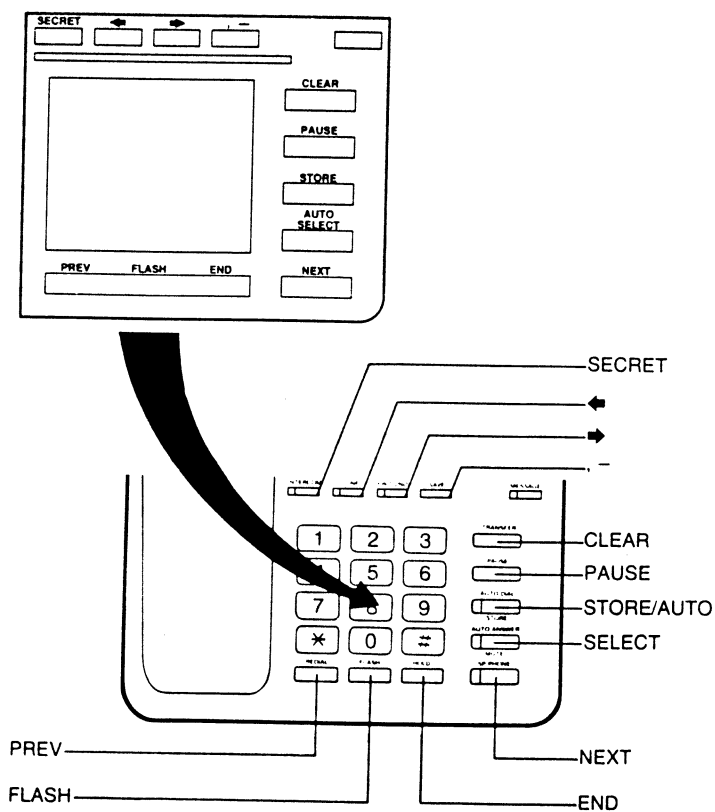


Fig. 4

DISASSEMBLY INSTRUCTIONS

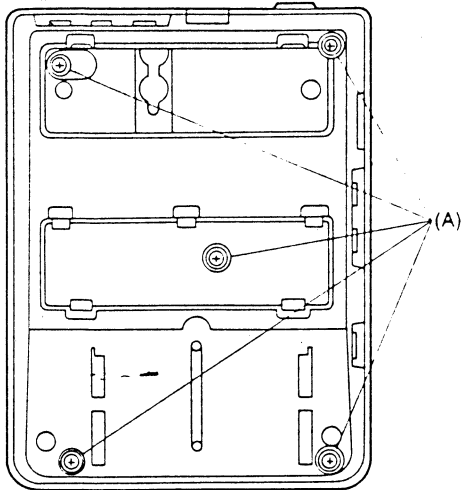


Fig. 5

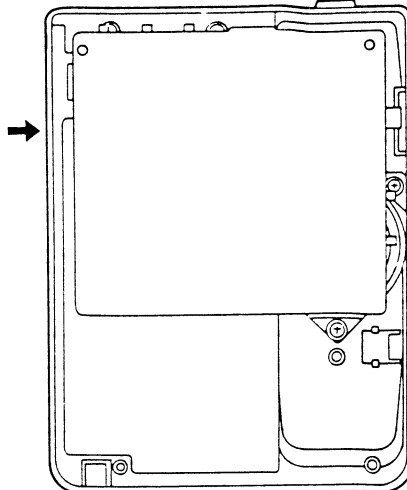


Fig. 6

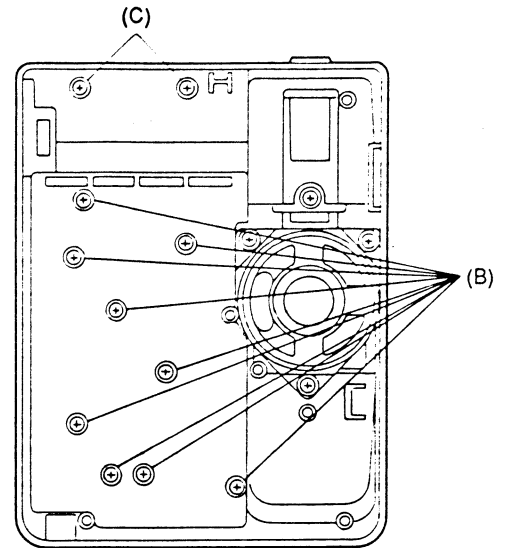


Fig. 7

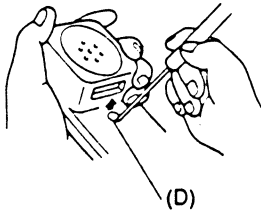


Fig. 8

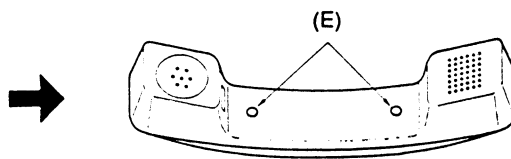


Fig. 9

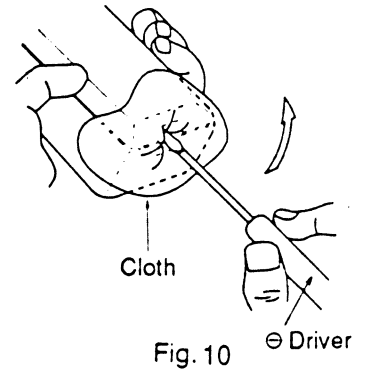


Fig. 10

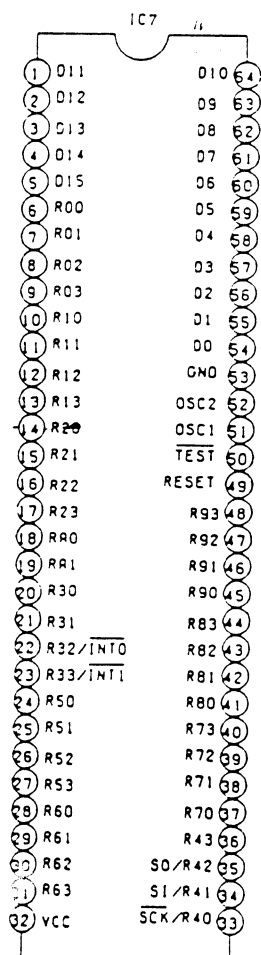
⊗ Driver

Ref. No.	Procedure	Shown in Fig. —	To remove—	Remove—
1	1	5	Lower Cabinet	Screw (3×14) (A)×5
2	1, 2	6	Main Board	Remove the Main Board. (Read Note 1)
3	1-4	7	Operation Board	Screw (2.3×8) (B)×9
4				Remove the Operation Board.
5	1, 2, 5	7	LCD Board	Screw (2.3×8) (C)×2
6	6-8	8	Handset Board	Rubbers (D)×2
7		9		Screws (3×10) (E)×2
8		10		Remove the cabinet.

Note 1:

When removing the Main P.C. Board, remove from direction of the arrow.

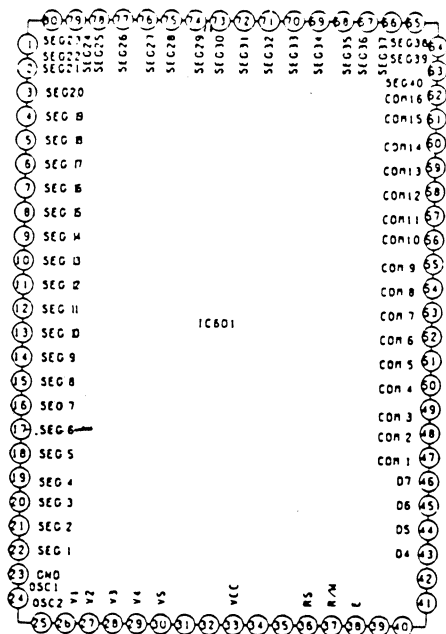
IC DATA



IC7
 Program ROM: PQVI4046SA92
 Internal RAM: 4K Byte (4 bit)
 Clock Frequency: 1K bit
 Power Supply Voltage: 2.5 MHz
 2.7-6 V

Pin No.	Mark	Function	High	Low
1	D11	LED Control Output	ON	OFF
2	D12	LED Control Output	ON	OFF
3	D13	LED Control Output	ON	OFF
4	D14	LED Control Output	ON	OFF
5	D15	LED Control Output	ON	OFF
6	R00	LED Control Output	ON	OFF
7	R01	LED Control Output	ON	OFF
8	R02	LED Control Output	ON	OFF
9	R03	LED Control Output	ON	OFF
10	R10	Tone Control Output	ON	OFF
11	R11	Tone Control Output	ON	OFF
12	R12	Tone Control Output	ON	OFF
13	R13	Tone Control Output	ON	OFF
14	R20	Speaker Mute	ON	OFF
15	R21	MIC Mute	ON	OFF
16	R22	Handset / SP-Phone Power Control	ON	OFF
17	R23	Not Used	-----	-----
18	RA0	Key Input	Disable	Enable
19	RA1	Ground	-----	-----
20	R30	LCD Data Output	-----	-----
21	R31	LCD Data Output	-----	-----
22	R32/ INT0	Interrupt Input	Standby	Active
23	R33/ INT1	Interrupt Input	Standby	Active

Pin No.	Mark	Function	High	Low
24	R50	Key Scan Output	Normal	Active
25	R51	Key Scan Output	Normal	Active
26	R52	Key Scan Output	Normal	Active
27	R53	Key Scan Output	Normal	Active
28	R60	DTMF Control	Normal	Active
29	R61	DTMF Control	Normal	Active
30	R62	DTMF Control	Normal	Active
31	R63	Not Used	-----	-----
32	Vcc	(+) Power Source Terminal	-----	-----
33	SCK/R40	Interrupt Output	Disable	Enable
34	SI/R41	Key Input	Disable	Enable
35	S0/R42	Key Input	Disable	Enable
36	R43	Key Input	Disable	Enable
37	R70	DTMF Control	Normal	Active
38	R71	DTMF Control	Normal	Active
39	R72	DTMF Control	Normal	Active
40	R73	DTMF Control	Normal	Active
41	R80	Not Used	-----	-----
42	R81	SP-Phone Chip Select Control Output	OFF	ON
43	R82	OHCA Test	-----	-----
44	R83	SP-Phone MIC Mute Control Output	ON	OFF
45	R90	Key Input	Disable	Enable
46	R91	Key Input	Disable	Enable
47	R92	Power Fail Detect Input	Power Down	Normal
48	R93	Hook Data Input	Off-Hook	On-Hook
49	RESET	System Reset Input	-----	-----
50	TEST	-----	-----	-----
51	OSC1	System Clock	-----	-----
52	OSC2	System Clock	-----	-----
53	GND	Ground	-----	-----
54	D0	LCD Enable Control Output	Active	Normal
55	D1	Key Input	Disable	Enable
56	D2	LED Reset Signal Output	Active	Normal
57	D3	Data Input Control	Normal	Active
58	D4	Data Input	Disable	Enable
59	D5	Data Output	Active	Normal
60	D6	Automatic Redial Signal Input	Disable	Enable
61	D7	SP-Phone Path Control	ON	OFF
62	D8	OHCA Path Control	ON	OFF
63	D9	LED Control Output	ON	OFF
64	D10	LED Control Output	ON	OFF



IC601:

Display Data RAM:

Character Generator ROM: 160 characters

PQVIHD44780

80×8 bits

Pin No.	Mark	Function	High	Low
1 22	SEG 22 SEG 1	LCD Segment Signal Output	40 State Output	
63 80	SEG 40 SEG 23			
23	GND	Ground		
24 25	OSC 1 OSC 2	System Clock		
26 30	V1 V5	Power Supply for LCD		
31 32		Not used		
33	Vcc	Power Supply		
34 35		Not used		
36	RS	Signal to select Resistors	Data Resistor	Instruction Resistor/ Address Resistor
37	R/W	Signal to Select Read and Write	Read	Write
38	E	Operation Start Signal for Data R/W	Active	Normal
39 42		Not used		
43 46	D4 D7	Data Bus		
47 62	COM 1 COM 16	LCD Common Signal Output	16 State Output	

BLOCK DIAGRAM

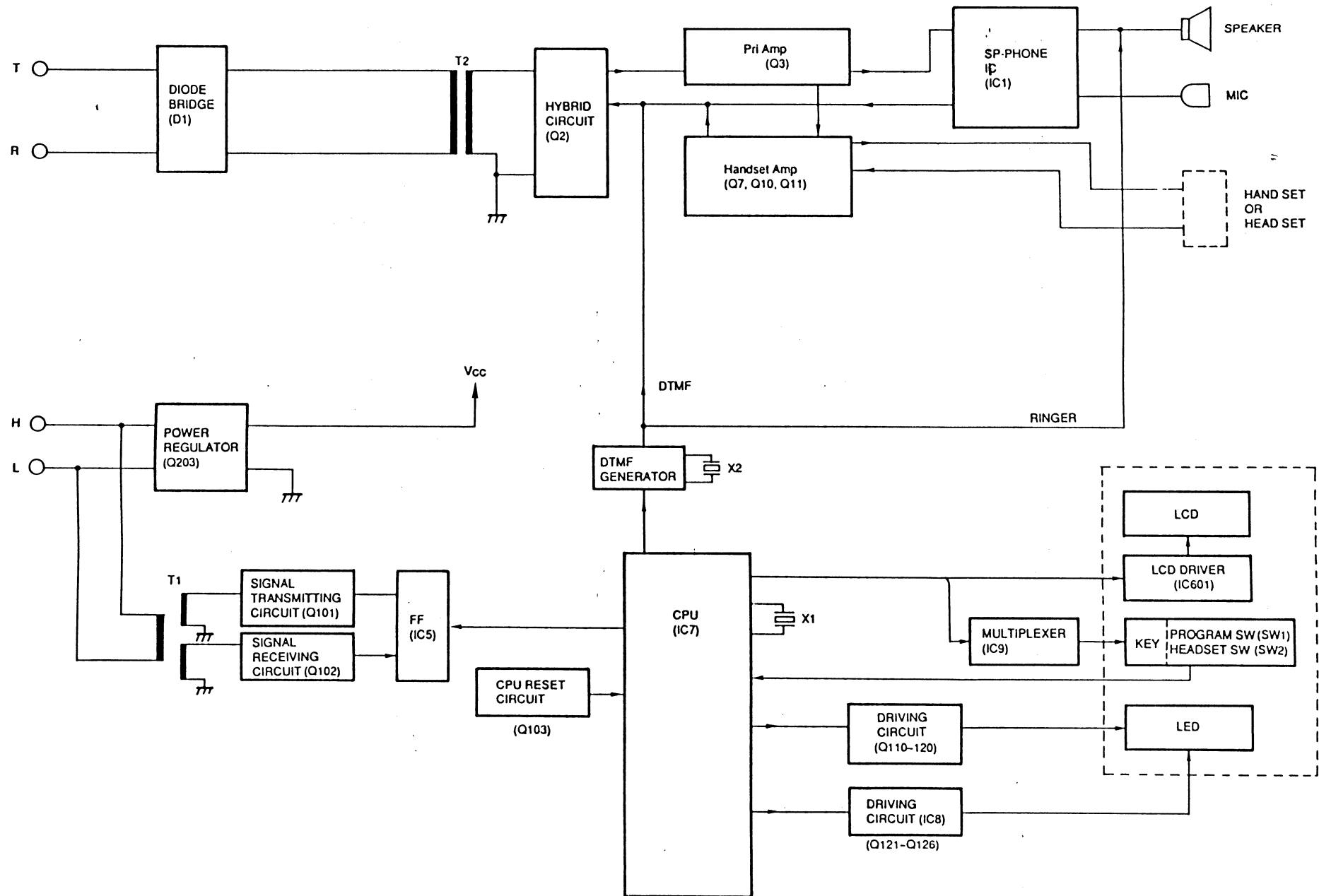


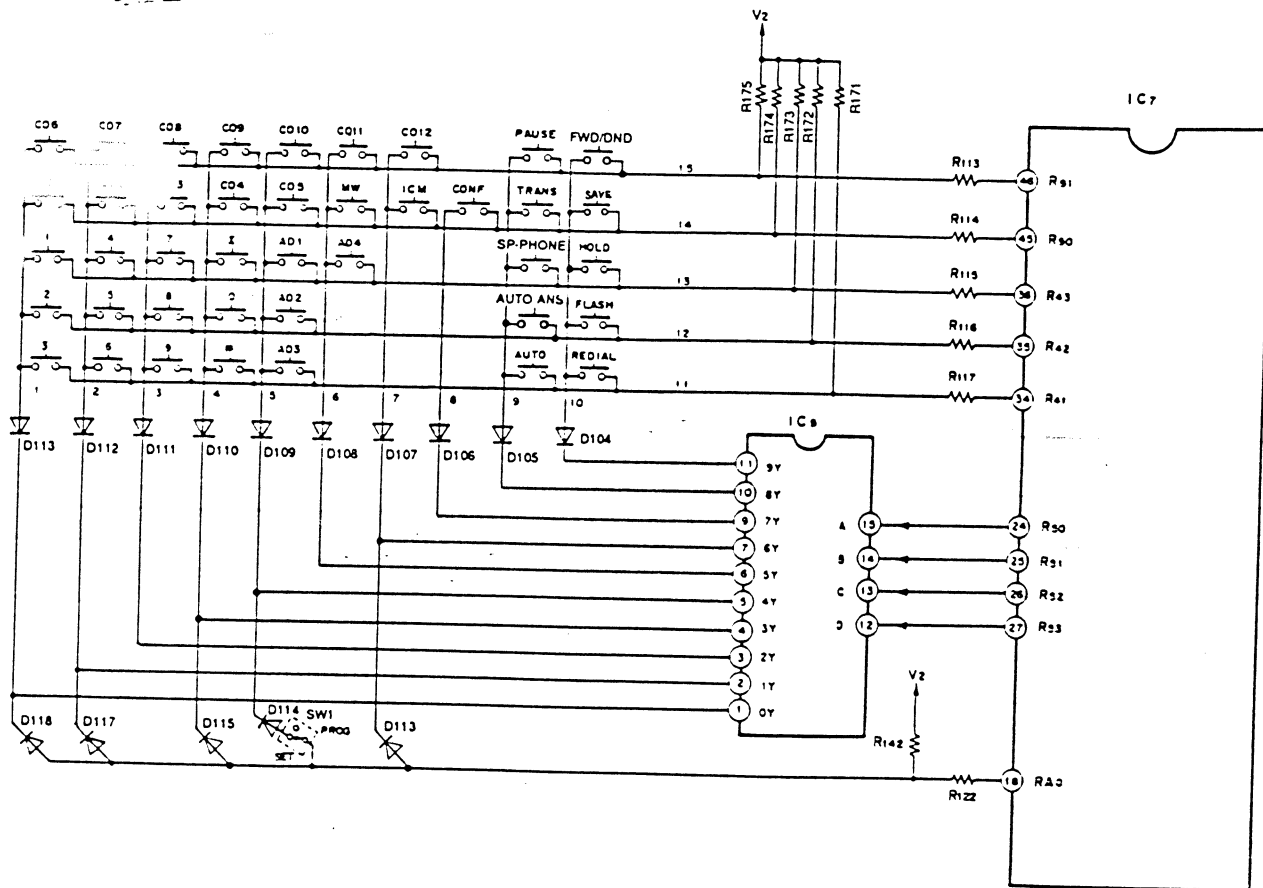
Fig. 11

CIRCUIT OPEARTIONS

■ KEY INPUT CONTROL CIRCUIT

Sequential input information (negative logic) from the EMSS proprietary telephone is executed by dynamic scanning. The ports 0Y to 9Y of IC9 are brought to low status consecutively, by the pulse sent from the ports R50 to R53 of IC7. If a key is pressed, the input of key-in information is executed by ports R41 to R43, R90 and R91.

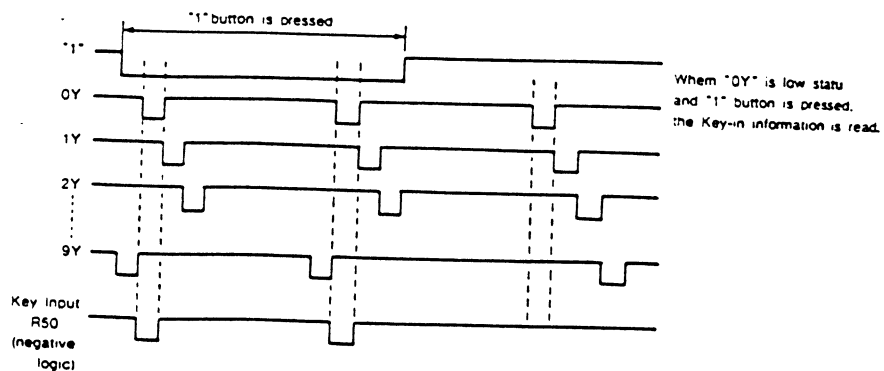
Circuit Diagram



Key Input Control Timing Chart

Logic of IC9

INPUT	OUTPUT
0Y	L
1Y	L
2Y	L
3Y	L
4Y	L
5Y	L
6Y	L
7Y	L
8Y	L
9Y	L



■ LCD CONTROL CIRCUIT

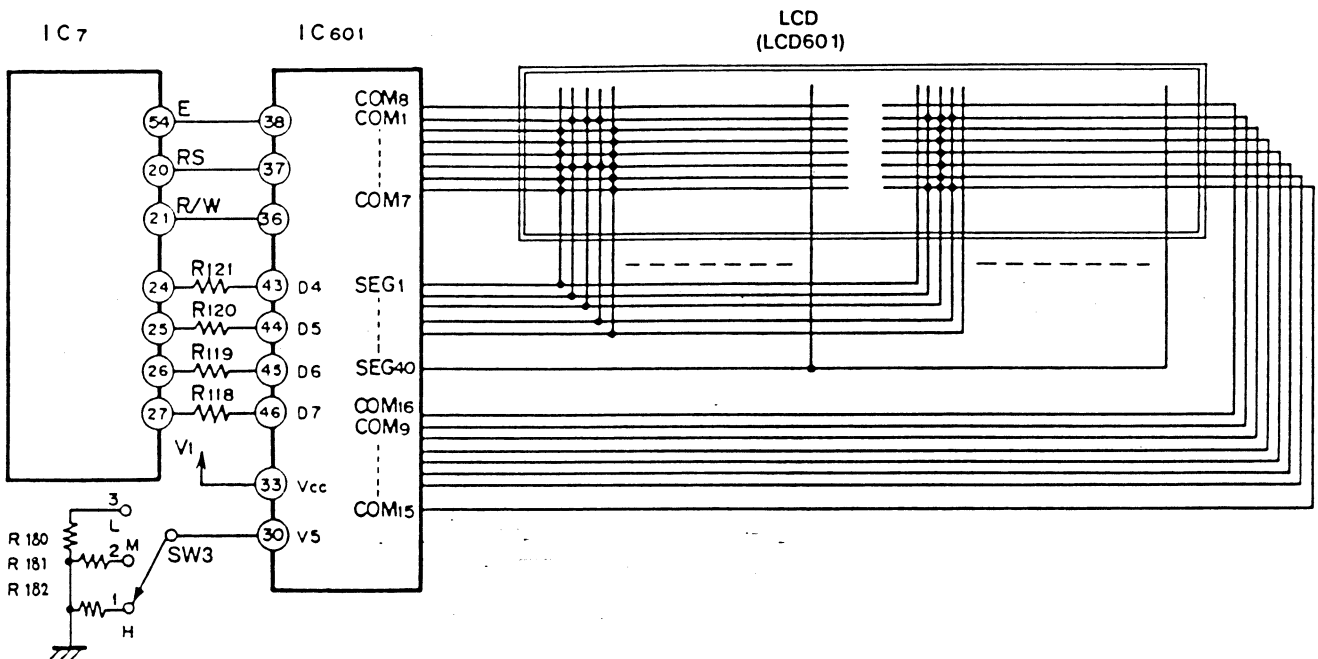
Circuit Operation:

The LCD data is outputted from pins 24 to 27 and is divided into two 4 bit parts.

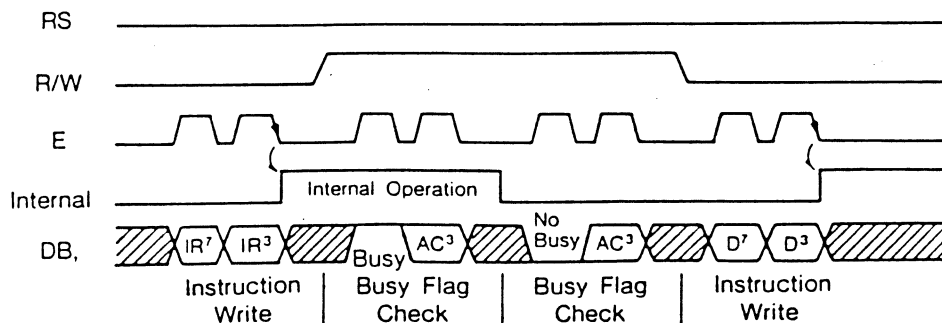
LCD contrast adjustment is performed by of R180, R181, R182 and SW3.

The contrast is determined only by the voltage level between Vcc and V5 and higher potential makes the contrast high.

Circuit Diagram



4-bit Data Transfer Timming Sequence



(Note) IR7, IR3 : Instruction 7th bit, 3rd bit
AC3 : Address Counter 3rd bit

LED CIRCUIT

Circuit Operation:

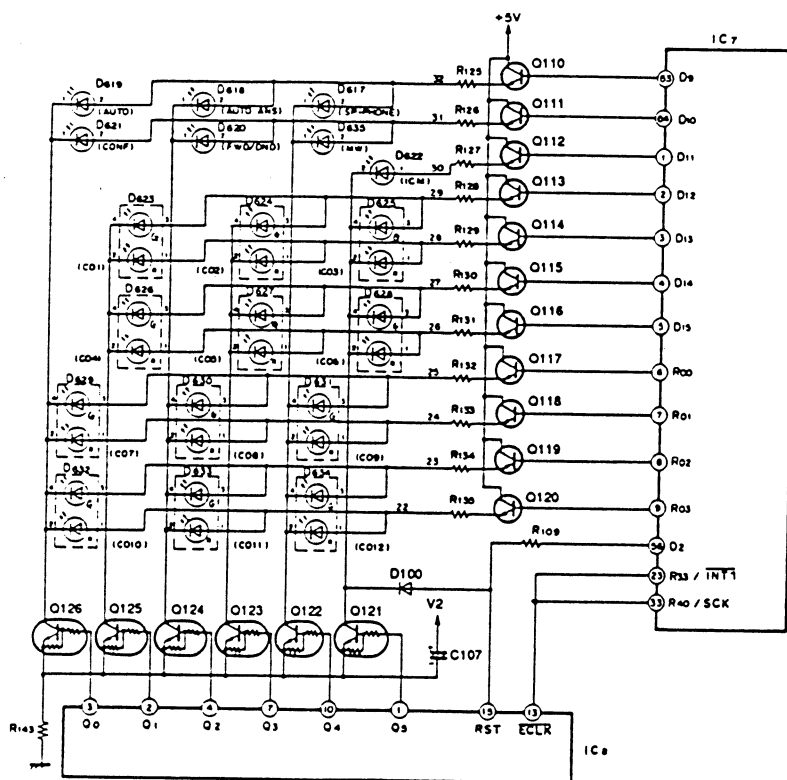
The LED executes dynamic lighting for the status indicators, and control is executed by the output ports Q0 to Q5 (column) of the decode counter (IC8) and D9 to D15, R00 to R03 of IC7.

When data transmission between the EMSS and the EMSS proprietary telephone is started, a fixed pulse ($T=3.3\text{msec}$, 1/2 duty) is output continuously from the SCK terminal of IC7, and this pulse is counted, and the output of IC8 is shifted sequentially from Q0 to Q4 and Q5.

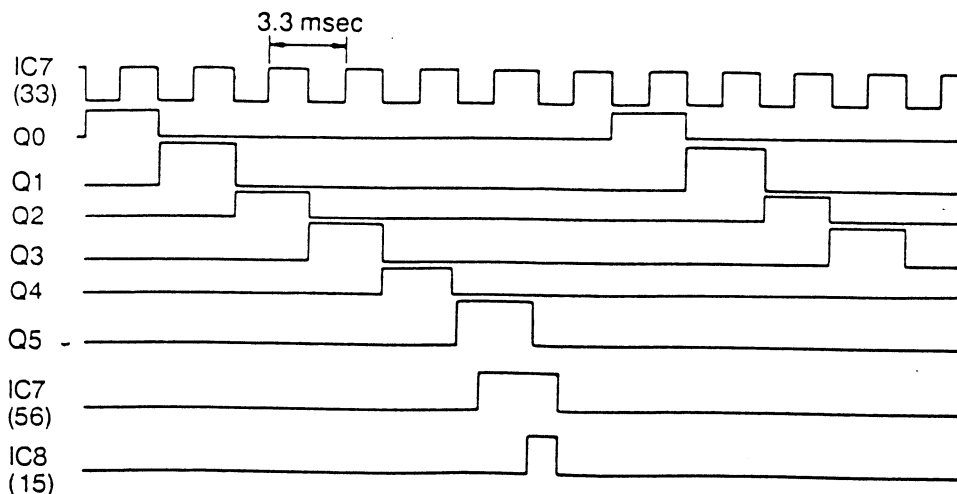
When Q5 becomes a high level, a high is output at the same time from pin 56 of IC7. When the level on IC8 (Q5) changes from a high to a low by the next pulse, pin 15 of IC8 becomes a high, so that the counter is reset, and output again will be executed sequentially from Q0.

On the other hand, D9 to D15 of IC7 plus R00 to R03 also output pulses, and the lighting of the LED is controlled by the timing of the outputs of IC8.

Circuit Diagram



Timing Chart



■ DATA COMMUNICATION CIRCUIT

Function:

The data communication circuit serves the following functions:

Information exchange between the EMSS and EMSS proprietary telephone, key input information as well as data for the LED control, LCD control, etc. this information is continuously exchanged at all times.

Circuit Operation:

When the EMSS proprietary telephone receives an IRQ signal from the EMSS and after sending the key input information (19 pulses) to the EMSS and receiving data (47 pulses) for LED control, etc. The EMSS proprietary telephone will return to the EMSS an acknowledge signal.

1) Reception

The data from the EMSS is received via the H and L line along the path shown below.

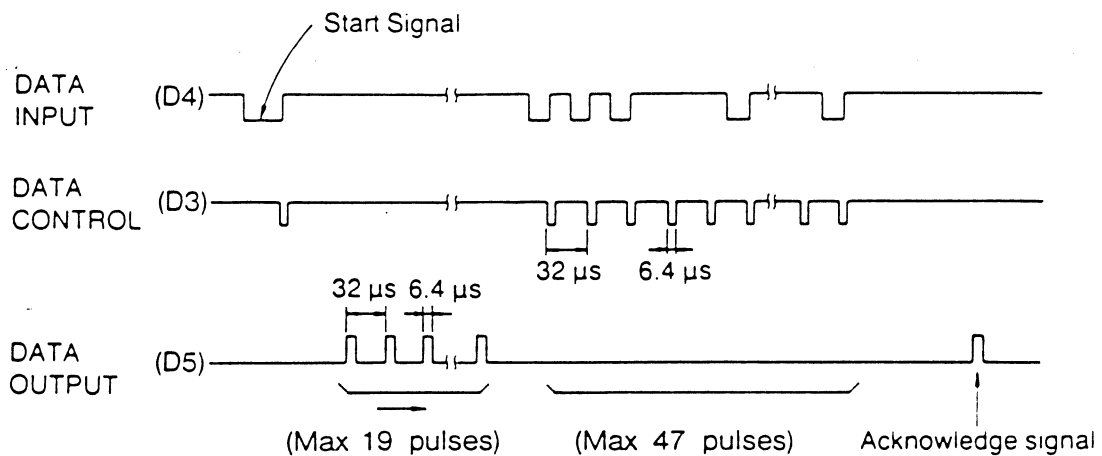
H, L Line → T1 → R116 → Q102 → IC5 → IC7 pin 58

2) Transmission

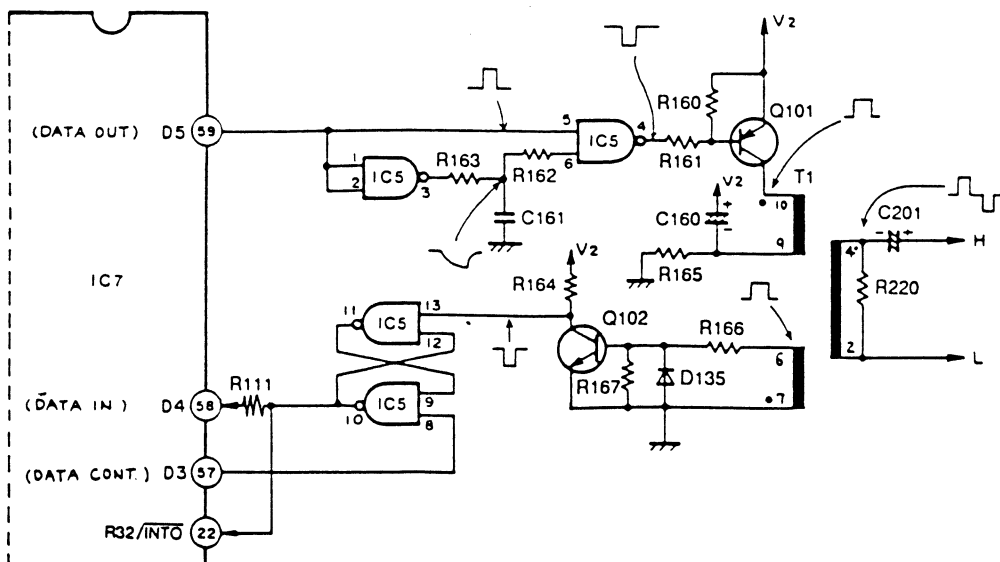
The data to the EMSS proprietary telephone is transmitted along the following path.

IC7 pin 59 → IC5 → R161 → Q101 → T1 → H, L Line

Timing Chart



Circuit Diagram



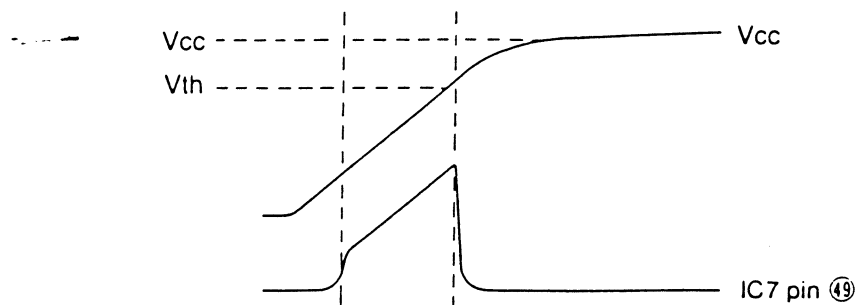
■ RESET CIRCUIT

Circuit Operation:

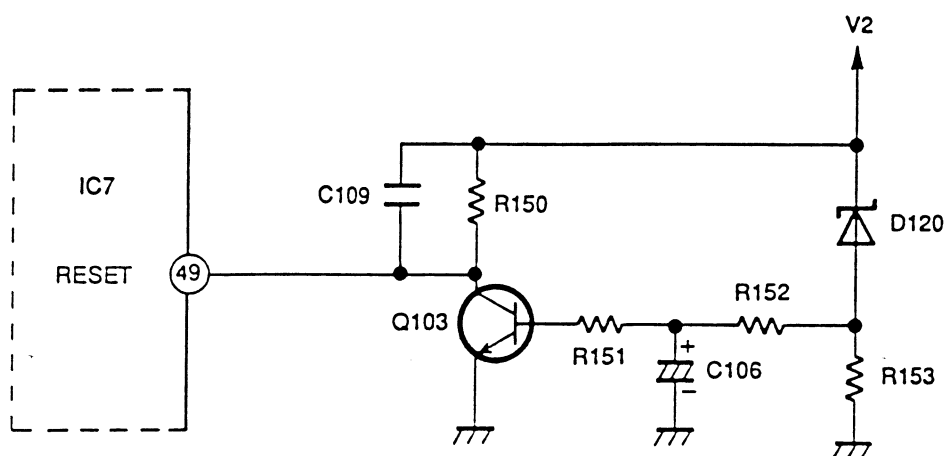
This circuit is used for transmission of a reset pulse to the CPU (IC7) at the following times, connecting the telephone line jack, circuit operation. The timing chart is shown below.

Power ON → Q103 ON → IC7 (pin 49) high level → Q103 OFF → IC7 (pin 49) low level

Timing Chart



Circuit Diagram



■ TONE GENERATION CIRCUIT

Function:

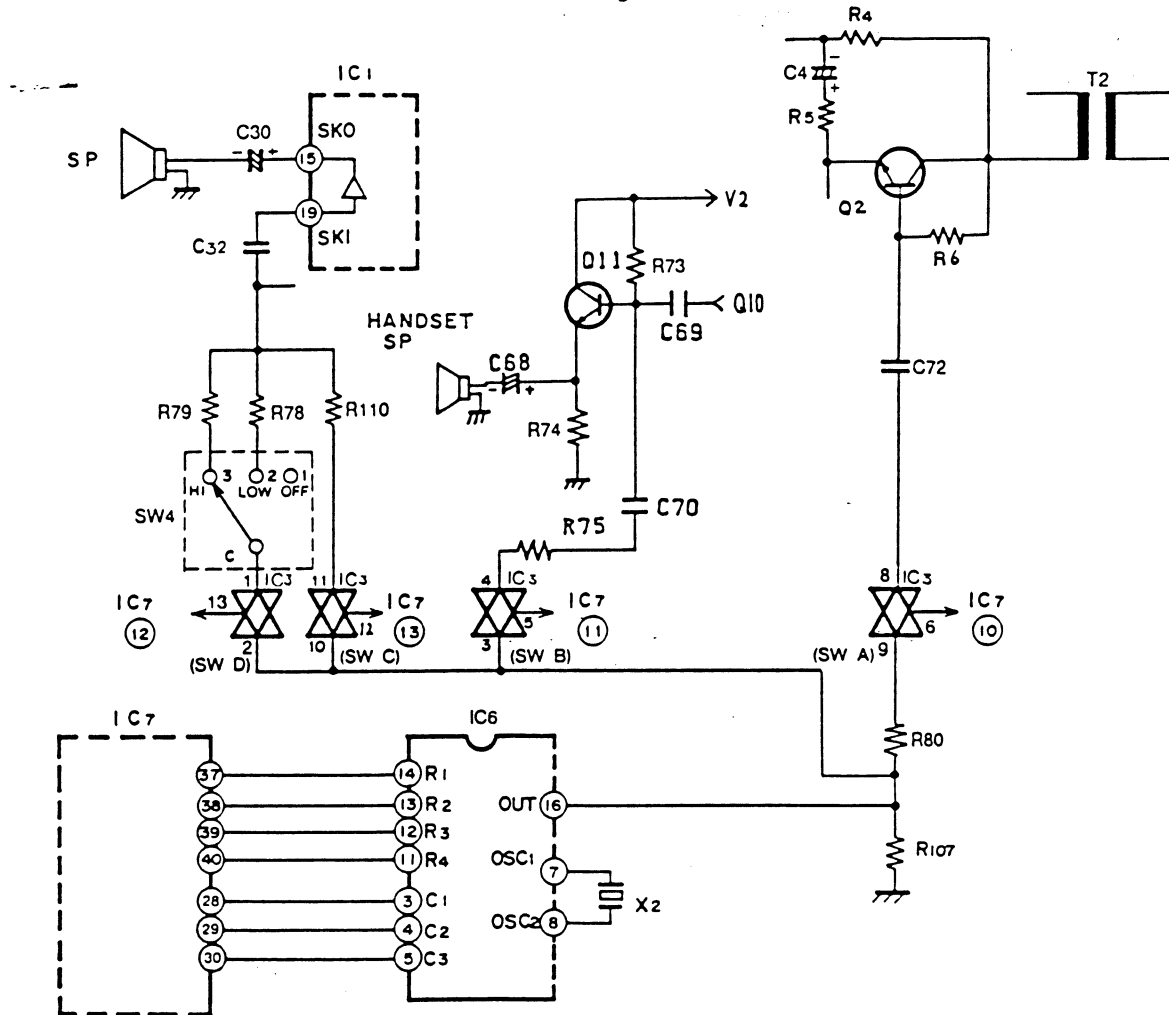
This circuit generates all system tones including COL, extension, busy, DTMF signals and key in confirmation tones during the power failure mode and is comprised of IC6 (DTMF Generator IC) and IC3 (Analog Switch).

Circuit Operation:

IC10 is the DTMF generator IC.

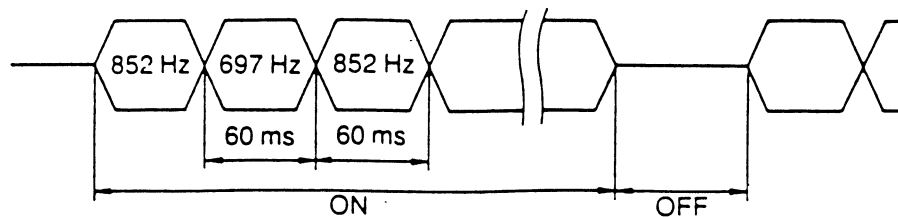
For an output of a single row tone, the row terminal and the each column terminals intersecting with it are required to be brought a low state. For a dual tone output, one row terminal and one column terminal are brought to low state.

Circuit Diagram



1) Calling Tones from COL and EXT.

For a calling tone from a CO line or extension, only pin 6 of IC3 (Analog Switch) is brought to high state thus the single row tone signal shown below is outputted from IC6, and the tone volume is controlled by SW4.



IC6 pin 16 → IC3 pin 2-1 → SW4 → C32 → IC1 pin 19 → IC1 pin 15 → C30 → SP

2) Busy Station Calling Tone

When pin 12 of IC3 (Analog Switch) is brought to a high state, this is done in the same way as for an COL or an extension lines calling tone.

852 Hz and 697 Hz signals are outputted from IC6 alternately at intervals of 60 ms.

The signal flow is shown below.

IC6 pin 16 → IC3 pin 10-11 → R110 → C32 → IC1 pin 19 → IC1 pin 15 → C30 → SP

3) DTMF Signal

When pins 5, 12 and 13 of IC3 are brought to a high state, a DTMF tone is generated by the logic combination as shown below.

The signal flow is shown below.

IC6 pin 16 — (To Telephone Line)
 (To Monitor) — IC3 pin 9-8 → Q2 → T2 → Telephone Line
 IC3 pin 3-4 → R75 → C70 → Q11 → C68 → Handset Speaker
 (IC3 pin 10-11 → R110 → C32 → IC1 pin 19 → IC1 pin 15 → C30 → SP)

DTMF Frequency Table

		High Group		
		1209 Hz	1336 Hz	1477 Hz
Low Group	697 Hz	1	2	3
	770 Hz	4	5	6
	852 Hz	7	8	9
	941 Hz	*	0	#

Truth Table

	C1	C2	C3	R1	R2	R3	R4
1	L	H	H	L	H	H	H
2	H	L	H	L	H	H	H
3	H	H	L	L	H	H	H
4	L	H	H	H	L	H	H
5	H	L	H	H	L	H	H
6	H	H	L	H	L	H	H
7	L	H	H	H	H	L	H
8	H	L	H	H	H	L	H
9	H	H	L	H	H	L	H
*	L	H	H	H	H	H	L
0	H	L	H	H	H	H	L
#	H	H	L	H	H	H	L

4) Key-In Tone

An 852 Hz single tone is used as the key-in tone. When pins 5 and 12 of IC3 are brought to a high state, a tone is generated from IC6 and is heard at the speaker.

The signal flow is shown below.

IC6 pin 16 — IC3 pin 3-4 → R75 → C70 → Q11 → C68 → Handset Speaker
 IC3 pin 10-11 → R110 → C32 → IC1 pin 19 → IC1 pin 15 → C30 → SP

CONDITION	IC7 pin 7	IC4 SWA	IC7 pin 11	IC4 SWB	IC7 pin 13	IC4 SWC	IC7 pin 12	IC4 SWD
Ringing	L	OFF	L	OFF	L	OFF	H	ON
Call Waiting	L	OFF	L	OFF	H	ON	L	OFF
Tone Dial (Handset)	H	ON	H	ON	L	OFF	L	OFF
Tone Dial (Speakerphone)	H	ON	L	OFF	H	ON	L	OFF

■ HANDSET CIRCUIT

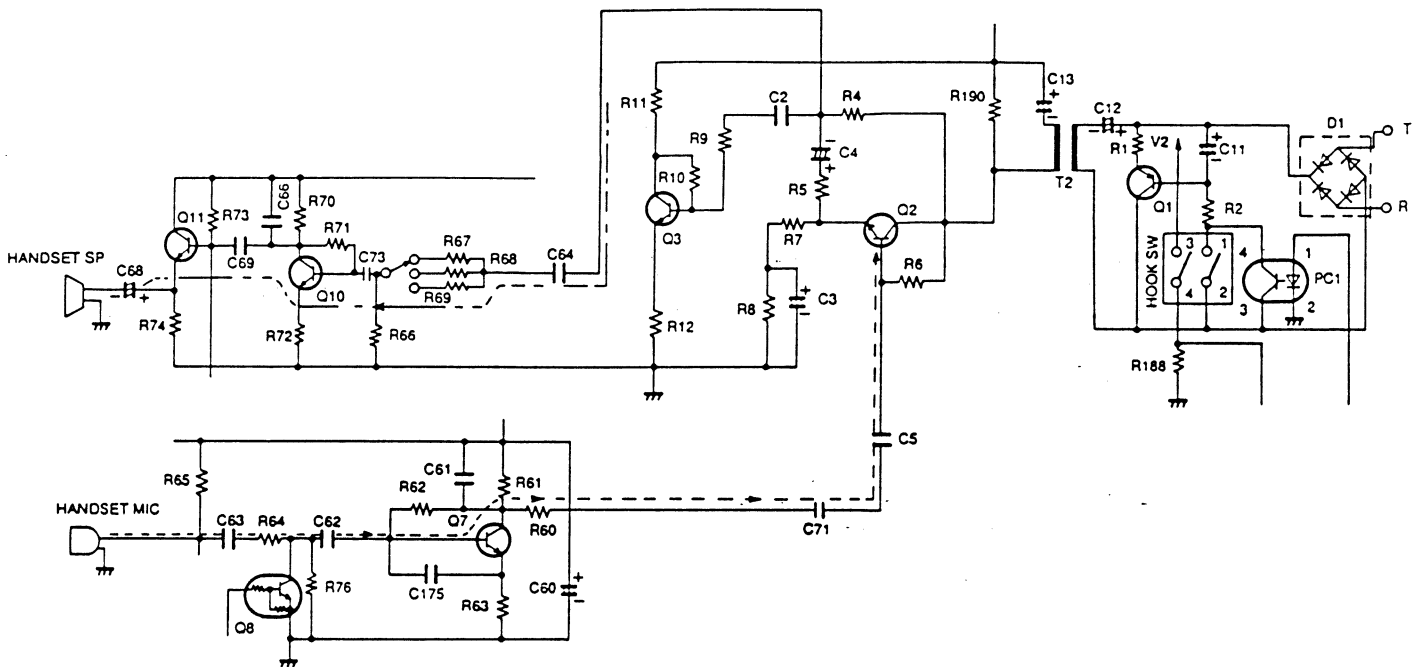
1) Transmission Signal Path

The input signal for the handset microphone is sent through the telephone line via the following path:
Handset MIC → C63 → R64 → C62 → Q7 → R60 → C71 → C5 → Q2 → T2 → D1 → Telephone Line

2) Reception Signal Path

The input signal from the telephone line is sent to the receiver through the following path:
Telephone Line → D1 → T2 → Q2 → Q10 → Q11 → C68 → Handset Speaker

Circuit Diagram



■ SPEAKERPHONE CIRCUIT

Function:

This circuit controls the automatic switching of the transmitted and received signals, to and from the telephone line, when the unit is used in the hands-free mode.

Circuit Operation:

The speakerphone can only provide a one-way communication path.

In other words, it can either transmit an outgoing signal or receive an incoming signal at a given time, but cannot do both simultaneously. Therefore, a switching circuit is necessary to control the flow of the outgoing and incoming signals. This switching circuit is contained in IC1 and consists of a Voice Detector, Tx Attenuator, Rx Attenuator, Comparator and Attenuator Control. The circuit analyzes whether the Tx (transmit) or the Rx (receive) signal is louder, and then it processes the signals such that the louder signal is given precedence.

The Voice Detector provides a DC input to the Attenuator Control corresponding to the Tx signal.

The Comparator receives a Tx and Rx signal, and supplies a DC input to the Attenuator Control corresponding to the Rx signal. The Attenuator Control provides a control signal to the Tx and the Rx Attenuator to switch the appropriate signals ON and OFF. The Attenuator Control also detects the level of the volume control to automatically adjust for changing ambient conditions.

1) Control Signal Path

Control signals for transmission and reception are inputted to IC1 via the following path:

(Transmission Control Signal Path)

MIC → IC1 pin 9 → IC1 pin 10 → IC1 pin 3 → IC1 pin 4 → IC1 pin 5

(Reception Control Signal Path)

Telephone Line → Q2 → Q3 → IC4 pin 1-2 → IC1 pin 7

2) Transmission/Reception Switching

The comparison result between Tx and Rx outputs as a DC level at IC1 pin 23 .

Tx level is highpin 23 = pin 20 - 6 mV

Rx level is high.....pin 23 = pin 20 - 150mV

The comparator output is connected to the attenuator control inside IC1.

3) Voice Detector

The output of the mic amp (pin 10 of IC1) is supplied to pin 13 of IC1 as a control signal for the voice detector.

4) Attenuator Control

The attenuator control detects the setting of the volume control through pin 24 of IC1 and automatically adjusts for changing ambient conditions.

5) Transmission Signal Path

The input signal from the microphone is sent through the circuit via the following path:

Note that, in this case, the logic states of pins 10, 11 and 12 are low, Low and Low respectively.

MIC → C39 → IC1 pin 9 → IC1 pin 10 → IC1 pin 3 → IC1 pin 4 → R14 → IC4 pin 4~3 → C5 → Q2 → T2 → D1 → Telephone Line

6) Reception Signal Path

Signals received from the telephone line are outputted at the speaker via the following path:

Note that, in this case, the logic states of pins 10, 11 and 12 are low, low and low.

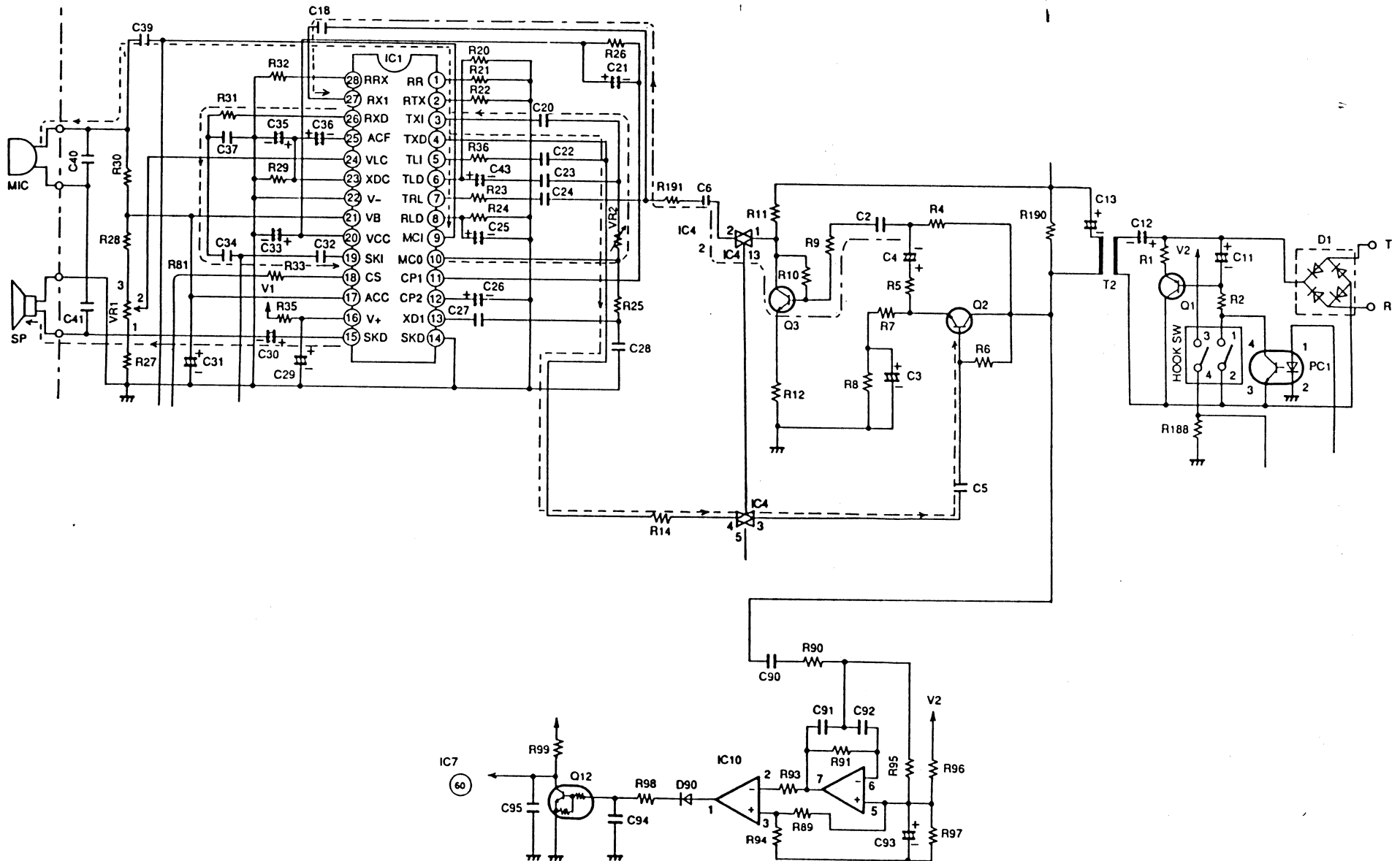
Telephone Line → D1 → T2 → Q2 → Q3 → IC4 pin 1-2 → C6 → R191 → IC1 pin 27 → IC1 pin 26 → IC1 pin 19 → IC1 pin 15 → SP

7) Busy Tone Detector Circuit

The busy tone detection for the automatic redialing is executed as follows:

Telephone Line → D1 → T2 → Q2 → Q3 → C90 → IC10 pin 6-7 → IC10 pin 2-1 → D90 → Q12 → IC7 pin 60

Circuit Diagram



OHCA (Off Hook Call Announcement) CIRCUIT

Circuit Operation:

The transmission and reception signals on the handset are sent and received, to and from the telephone line (Tip and Ring). But those of OHCA are executed, in the speakerphone mode, through the OHCA path (OHCA 1 and OHCA 2). The OHCA path and the OHCA power (ON/OFF) are controlled by the pins 17, and 41 of IC7.

Note that, in this case, the logic states of pins 10, 11 and 12 are Low, Low and Low.

1) Transmission Signal path (OHCA mode)

The input signal from the microphone is sent through the OHCA line via the following path:

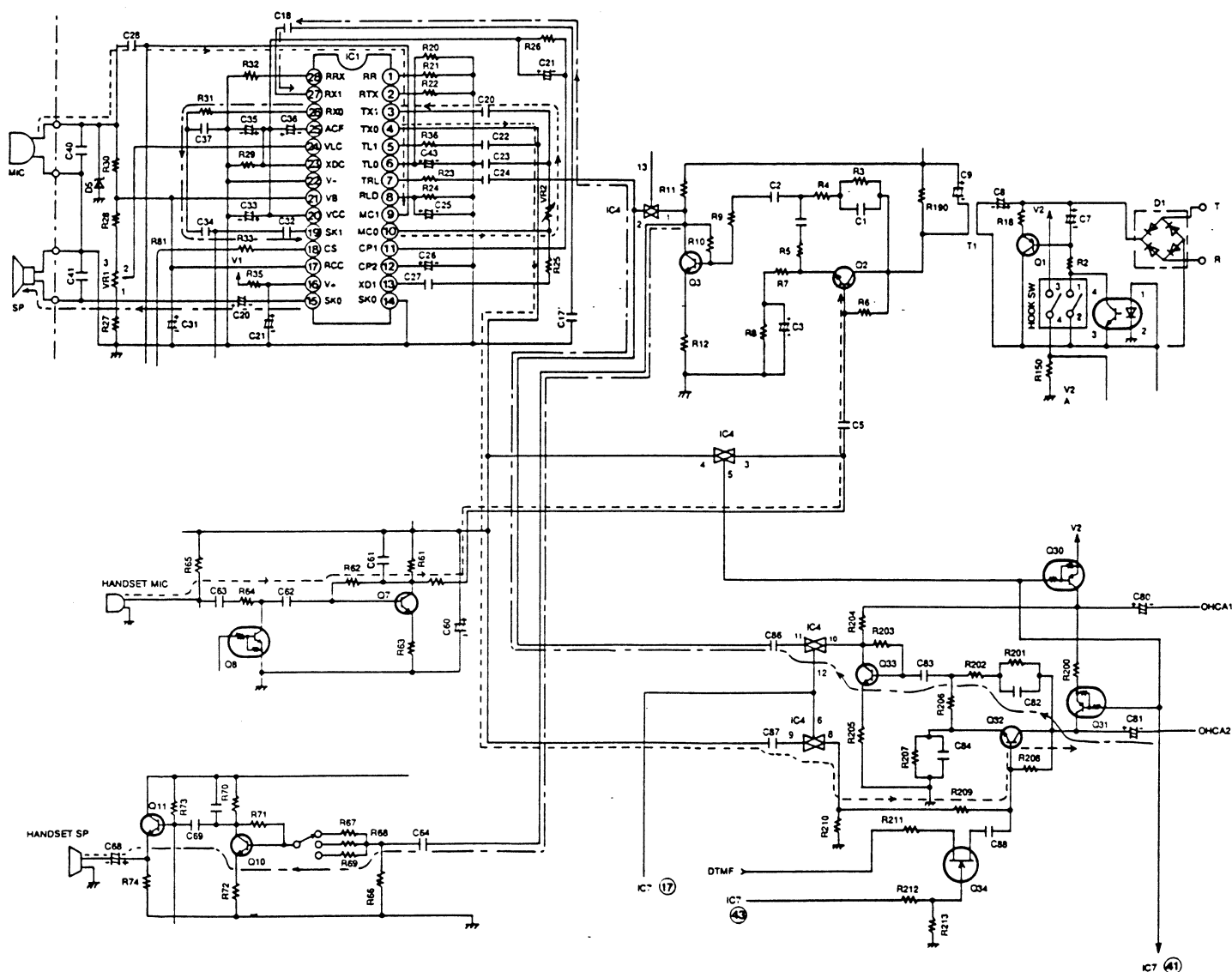
MIC → C28 → IC1 pin 9 → IC1 pin 10 → IC1 pin 3 → IC1 pin 4 → IC4 pin 9-8 → Q32 → C80, C81 → OHCA Line

2) Reception Signal Path (OHCA mode)

The input signal from the OHCA line is sent to the speaker via the following path:

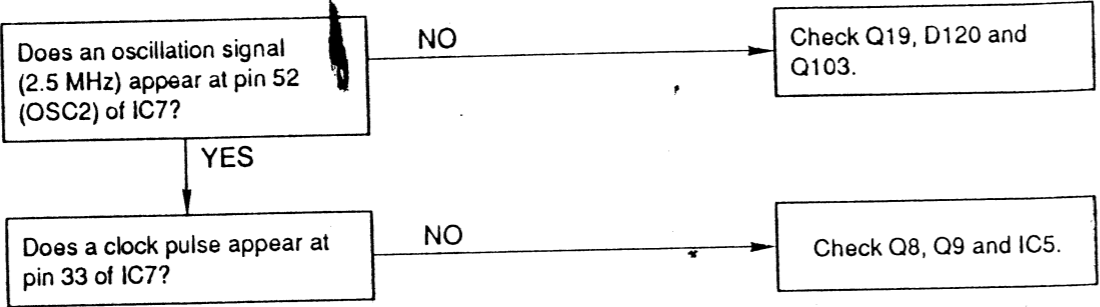
OHCA LINE → C80, C81 → Q33 → IC4 pin 10-11 → IC1 pin 27 → IC1 pin 26 → IC1 pin 19 → IC1 pin 15 → SP

Circuit Diagram

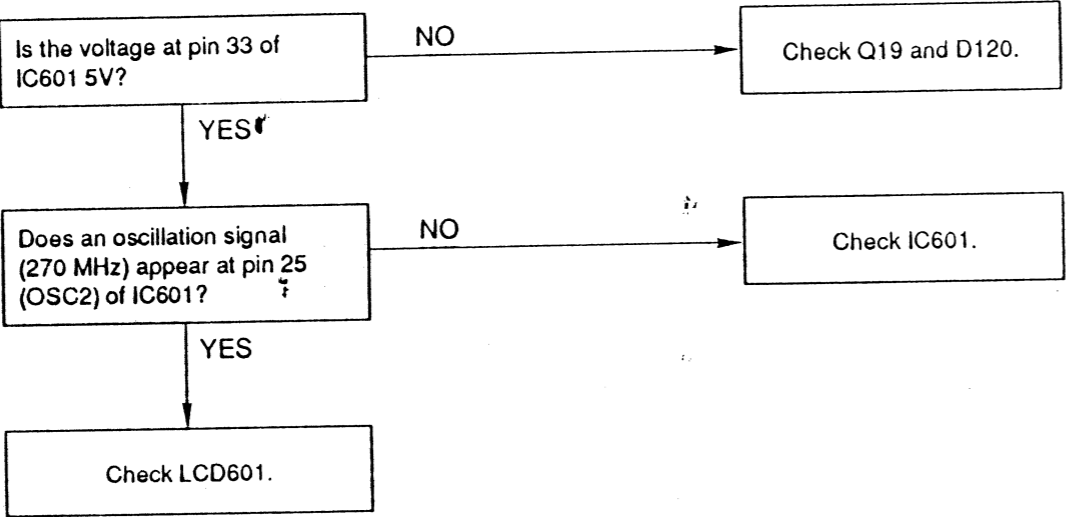


TROUBLE SHOOTING GUIDE

1) NO OPERATION



2) LCD DOES NOT OPERATE



ADJUSTMENTS

•Perform the following adjustment after replacing IC1.

Test Equipment:
Loop Simulator (PQZZ2000), DC Power Supply RC Oscillator VTVM
Preparation:
1. Set the unit's controls as follows: A. VOLUME CONTROL—"MAX" 2. Connect Test Points ∇ -(∇) and ∇ -(∇). 3. Disconnect the microphone in the unit. 4. Set the variable resistor of the loop simulator to maximum resistance (fully counterclockwise). 5. Connect the DC power supply. (Set voltage...12 V) 6. Connect the unit to the loop simulator. 7. Make all adjustments in a quiet room. 8. After all adjustments are made, disconnect Test Points ∇ -(∇), ∇ -(∇) and connect the microphone.
Adjustment Level:
1. Set the loop simulator selector switch to "TX". 2. Connect the RC Oscillator to Test Point ∇ -(∇)-(+) and connect an electrolytic capacitor (50 V, 1 μ F) as shown below. 3. Set RC Oscillator to 1 kHz, -56 dBm. <div style="text-align: center;"> </div> 4. Connect the VTVM to loop simulator. 5. Adjust VR2 for a reading of -17 dBm, ± 0.5 dBm, on the VTVM.

Please refer to Printed Circuit Board which is located test points (∇).

Schematic Diagram of Loop Simulator

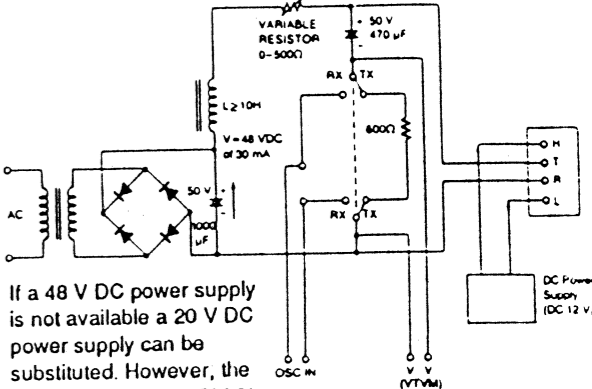


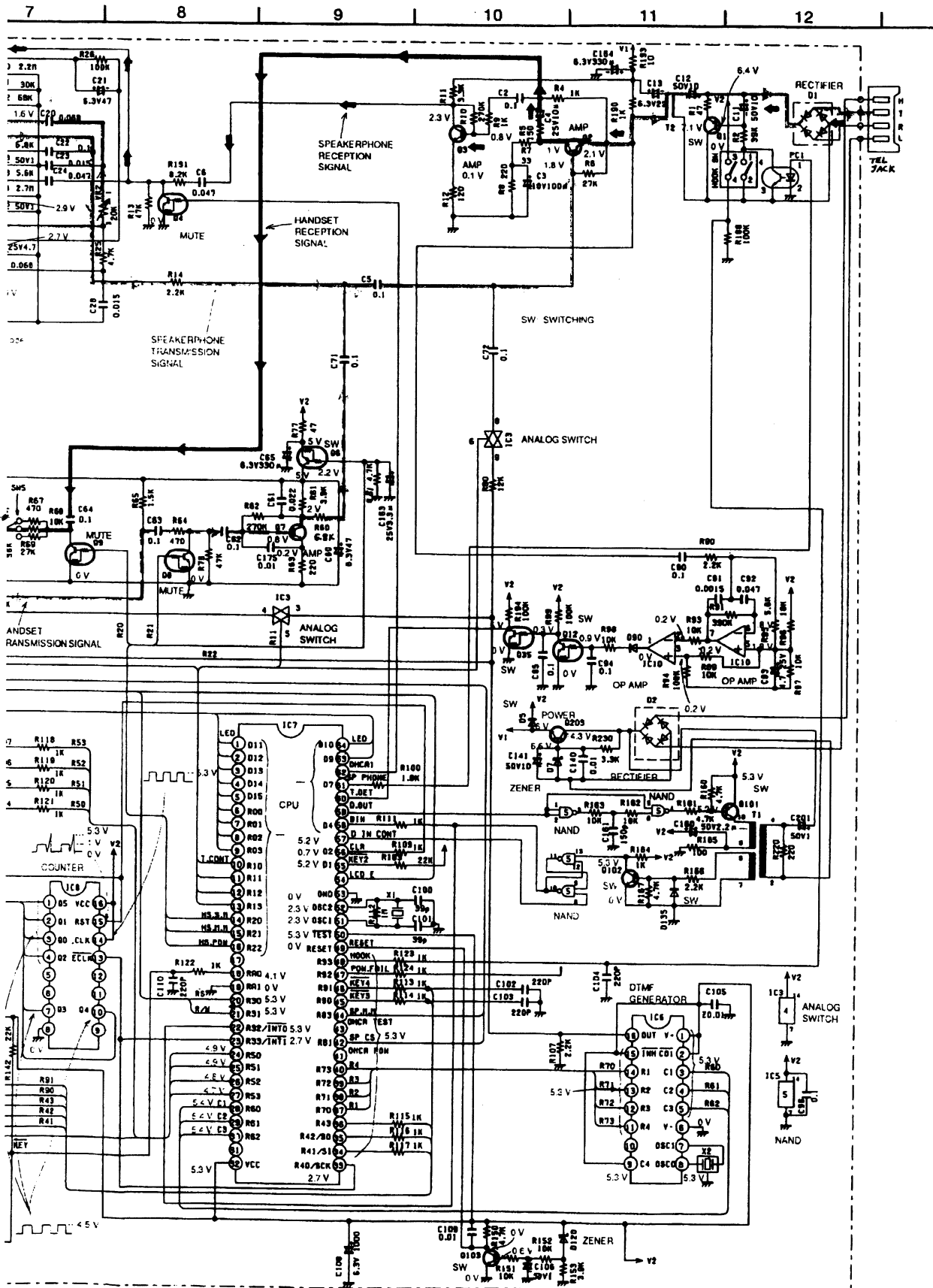
Fig. 12

SCHEMATIC DIAGRAM

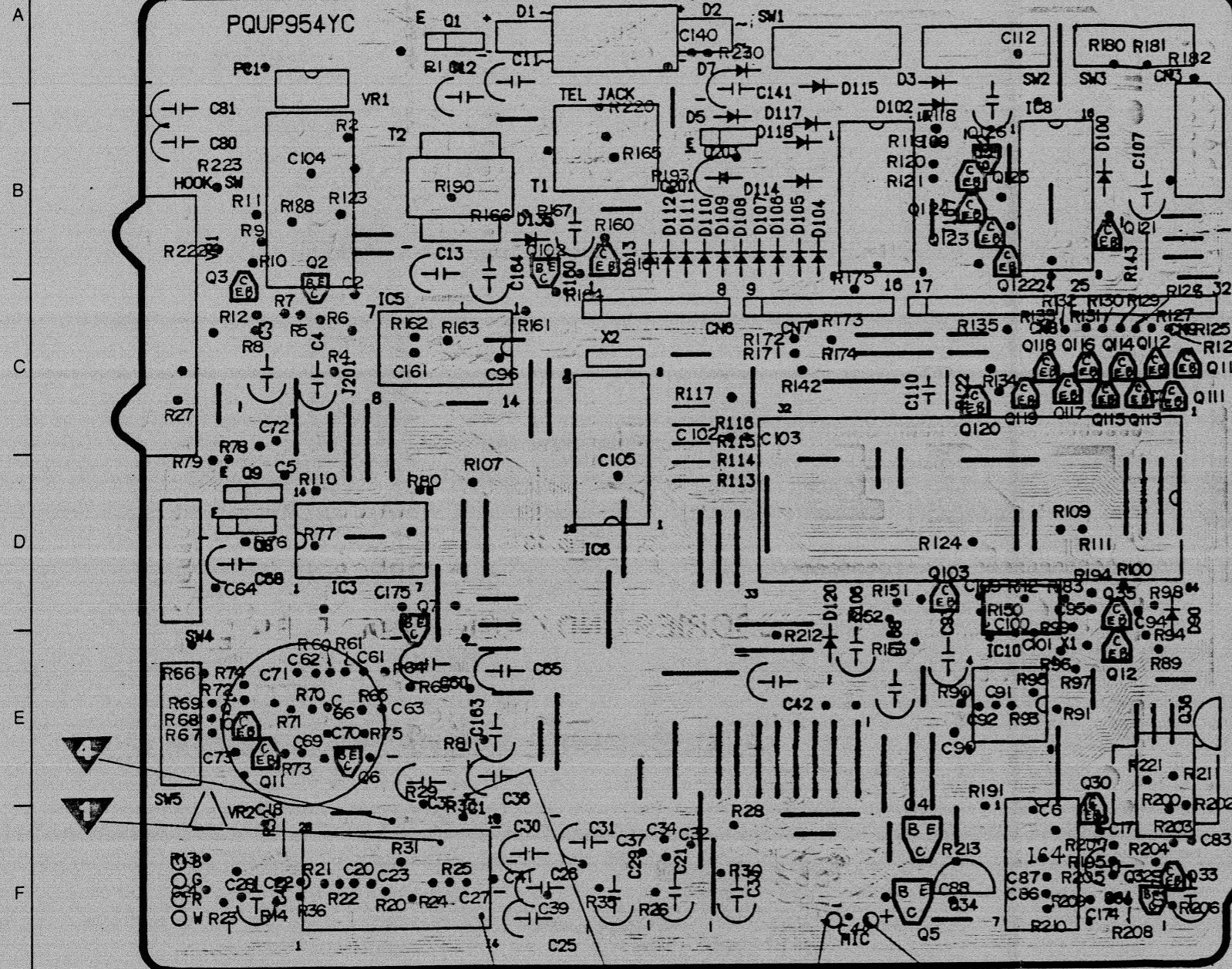
SCHEMATIC DIAGRAM



RAM



COMPONENT VIEW



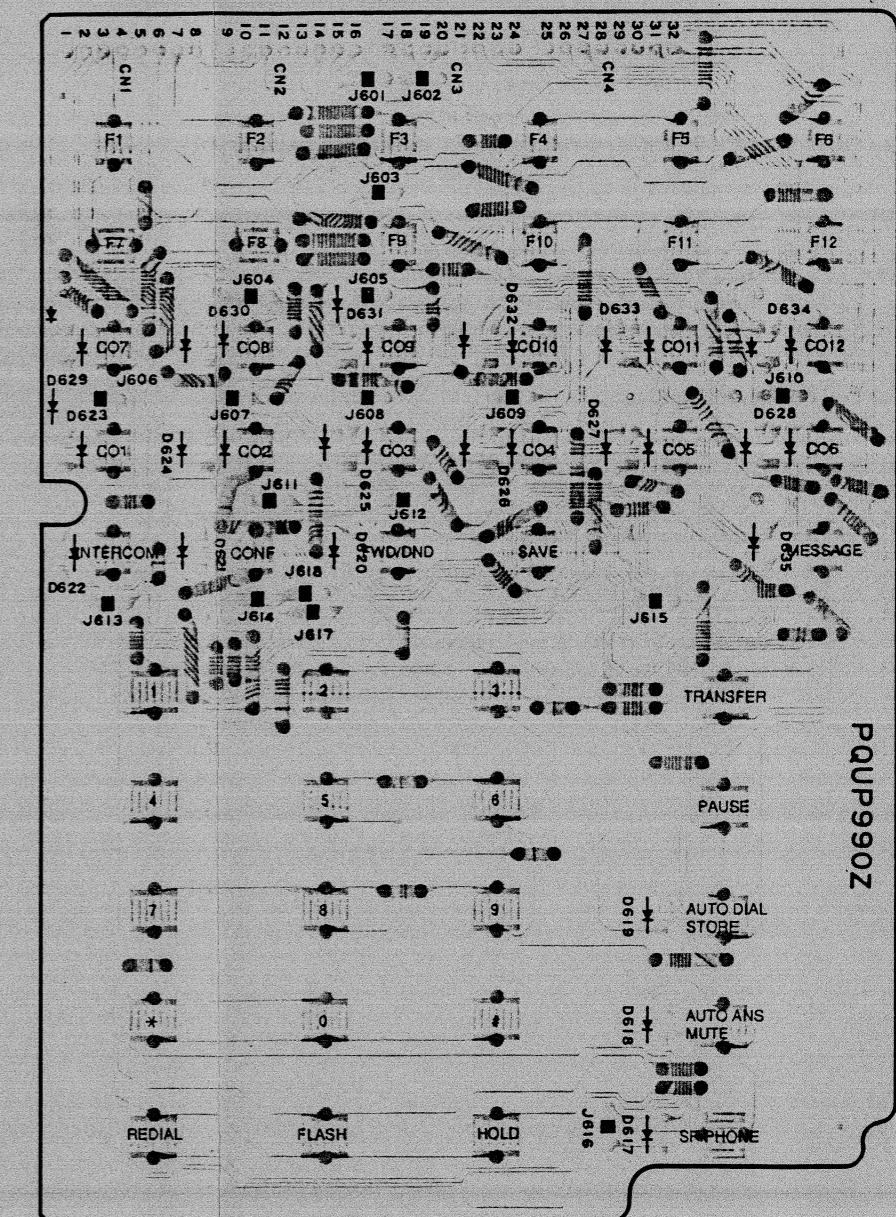
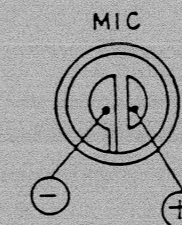
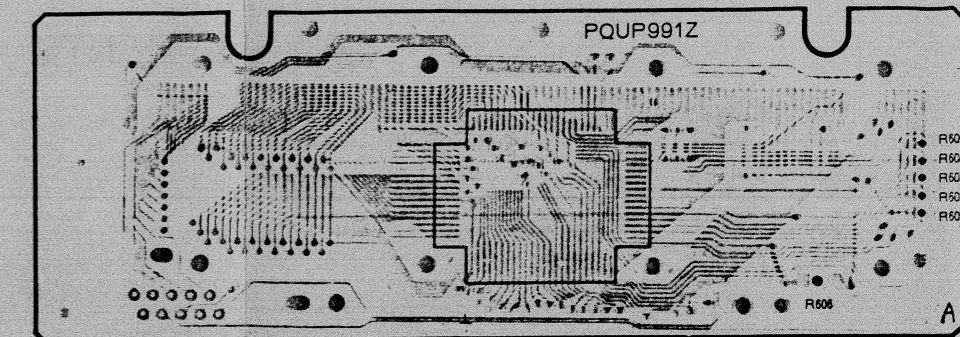
■ FOR SCHEMATIC DIAGRAM

Notes:

1. SW1: Memory switch in "SET" position.
2. SW2: Handset/Headset switch in "HANDSET" position.
3. SW3: Contrast selector switch in "H" position.
4. SW4: Ringer volume selector switch in "HIGH" position.
5. SW5: Handset volume switch in "NORMAL" position.
6. HOOK SW: Hook switch
7. S200: Dial switch. (Rubber switch)
8. DC voltage measurements are taken with electronic voltmeter or oscilloscope from ground.

(Off-Hook condition
IC1 ... Speakerphone ON condition)

9. This schematic diagram may be modified at any time with the development of new technology.



- Notes:
1. The circuit shown in on the conductor indicates printed circuit on the back side of the printed circuit board.
 2. The circuit shown in on the conductor indicates printed circuit on the front side of the printed circuit board.

3. This printed circuit board may be modified at any time with the development of new technology.









ADJUSTMENTS

- Perform the following adjustment after replacing IC1.

Test Equipment:

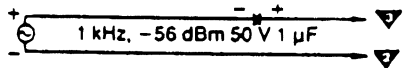
Loop Simulator, DC Power Supply
RC Oscillator
VTVM

Preparation:

1. Set the unit's controls as follows:
 - A. VOLUME CONTROL—"MAX"
2. Connect Test Points - and -.
3. Disconnect the microphone in the unit.
4. Set the variable resistor of the loop simulator to maximum resistance (fully counterclockwise).
5. Connect the DC power supply.
(Set voltage...12 V)
6. Connect the unit to the loop simulator.
7. Make all adjustments in a quiet room.
8. After all adjustments are made, disconnect Test Points -,
- and connect the microphone.

Adjustment Level:

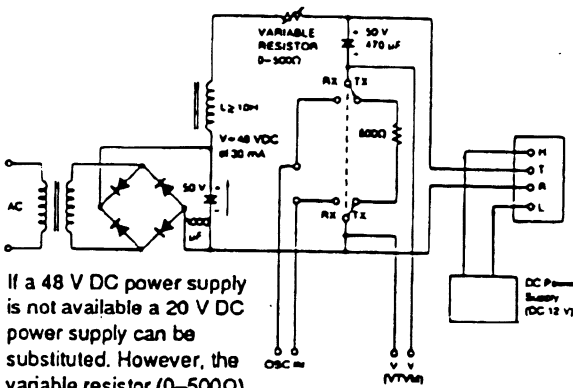
3. Set the loop simulator selector switch to "TX".
4. Connect the RC Oscillator to Test Point $\nabla(-) - \nabla(+)$, and connect an electrolytic capacitor (50 V, 1 μ F) as shown below.
5. Set RC Oscillator to 1 kHz, -56 dBm.



- Connect the VTVM to loop simulator.
- Adjust VR2 for a reading of -17 dBm , $\pm 0.5 \text{ dBm}$, on the VTVM.

Please refer to Printed Circuit Board which is located test points (▼).

Schematic Diagram of Loop Simulator



If a 48 V DC power supply is not available a 20 V DC power supply can be substituted. However, the variable resistor (0–500 Ω) must be set to 0 ohms

Fig. 12

EXTENSION CORD CONNECTING METHOD

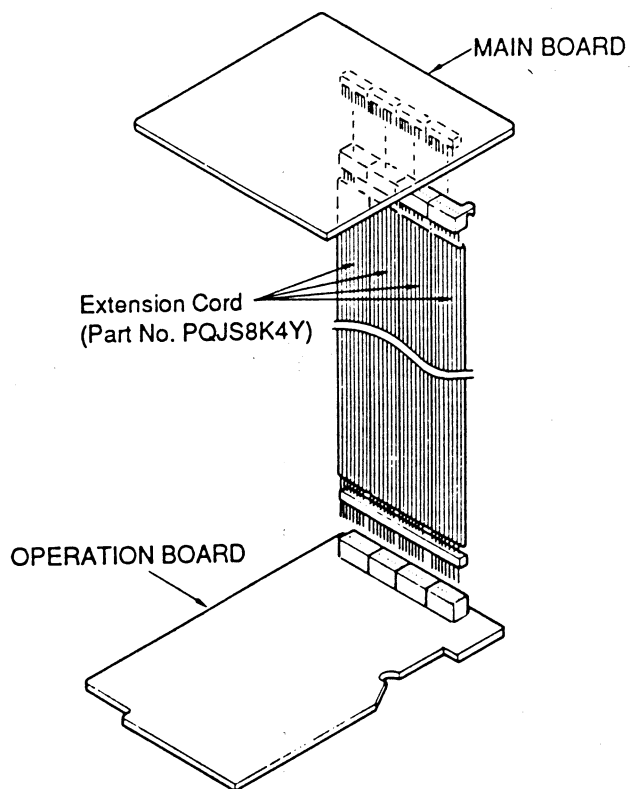


Fig. 13

ACCESSORIES AND PACKING MATERIALS

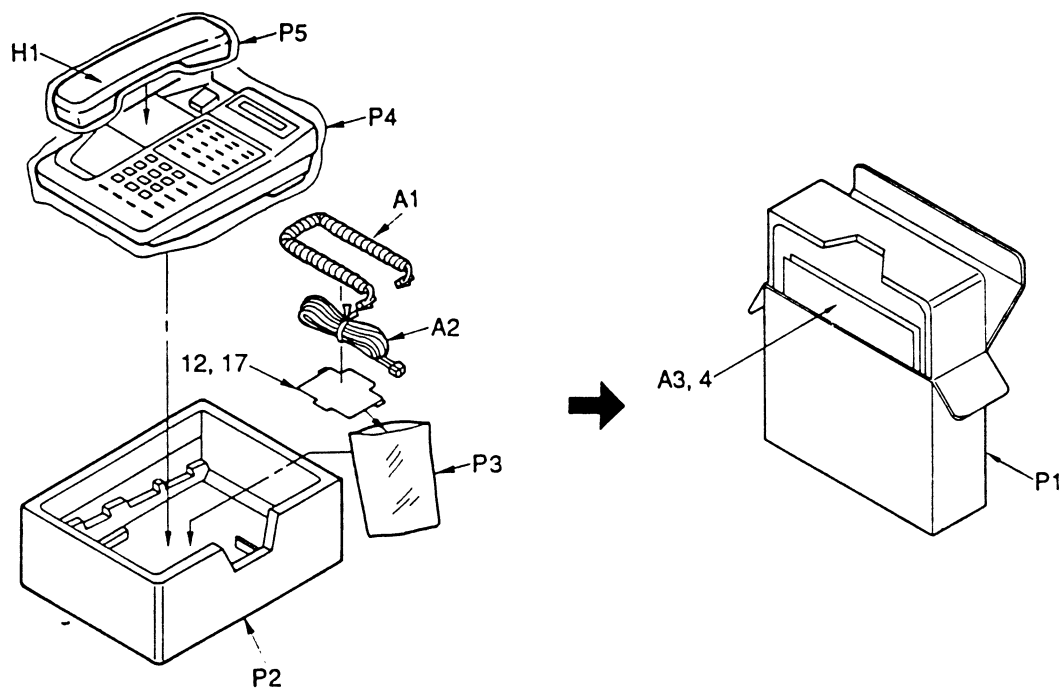
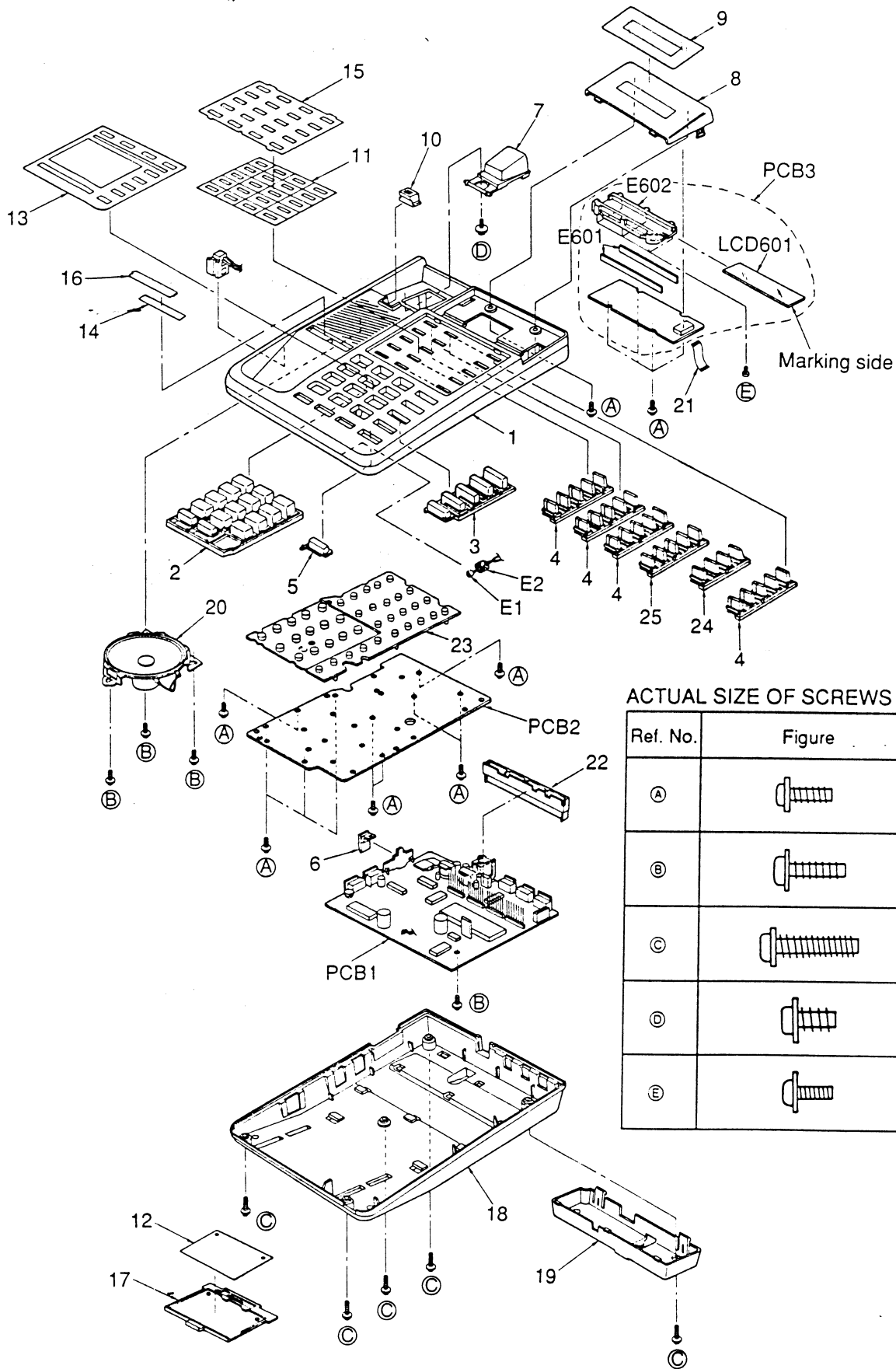


Fig. 14

CABINET AND ELECTRICAL PARTS LOCATION





ACTUAL SIZE OF SCREWS

Ref. No.	Figure	Part No.
(A)		XTW26+S8F
(B)		XTW3+S10M
(C)		XTW3+S14P
(D)		XTW3+W6F
(E)		XTN23+8C

Fig. 15

HANDSET PARTS LOCATION

ACTUAL SIZE OF SCREWS

f. No.	Figure	Part No.
Ⓐ		XTN3+10G
Ⓑ		XTW3+W8P

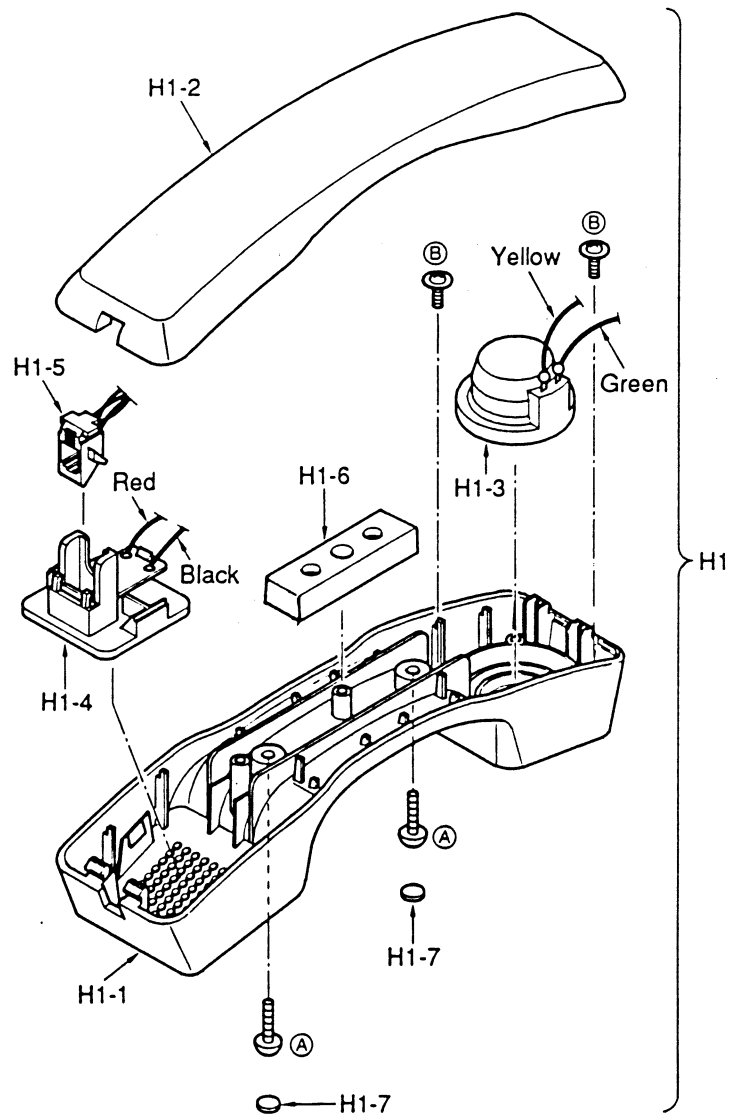


Fig. 16

REPLACEMENT PARTS LIST

Model KX-T7130

Notes:

1. Printed circuit board assembly with mark (NLA) is no longer available after production discontinuation of the complete set.
3. The S mark indicates service standard parts and may differ from production parts.
4. RESISTORS & CAPACITORS

Unless otherwise specified.

All resistors are in ohms(Ω) k=1000 Ω , M=1000k Ω All capacitors are in MICRO FARADS(μ F) P= μ F

*Type & Wattage of Resistor

Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PORD:Carbon	ER0:Metal Film	ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W
------------	------------	---------	------	------	------

*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor	ECQD,ECKD,ECBT,PQCB: Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG: Polyster
PQCUV:Chip	ECEA,ECSZ: Electrolytic
ECQMS:Mica	ECQP: Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V
2E:250V	2:200V	1V:35V	1C :16V	1J :63V
2H:500V		0J:6.3V	1E,25:25V	2A :100V

Ref. No.	Part No.	Part Name & Description	Pcs
CABINET AND ELECTRICAL PARTS			
1	PQKM209Z8	UPPER CABINET	1
2	PQBCX198Z	BUTTON, DIAL/REDIAL/FLASH	1
3	PQBCX199Z	BUTTON, TRANS/PAUSE/AUTO etc.	1
4	PQBCX215Z	BUTTON, MEMORY-A	4
5	PQBC282Z	BUTTON, HOLD	1
6	PQBD166Y	KNOB, VOLUME	1
7	PQBE37Z	BUTTON, HOOK	1
8	PQGG91Z	GRILLE	1
9	PQGP130Z	LCD PANEL	1
10	PQKE82Z	HANGER	1
11	PQHP5119Z	TEL. NO. CARD (LARGE)	1
12	PQHP5107Z	MEMORY CARD	1
13	PQHP5118Z	OVERLAY	1
14	PQHP532X	TEL. NO. CARD (SMALL)	1
15	PQHR5393Z	TRANSPARENT PLATE	1
		(TEL. NO. CARD (LARGE))	
16	PQHR576Z	TRANSPARENT PLATE	1
		(TEL. NO. CARD (SMALL))	
17	PQHR9565Z	COVER, MEMORY CARD	1
18	PQYFT7130X8	LOWER CABINET ASS'Y	1
19	PQYL7030X8	STAND ASS'Y	1
20	PQAS65P06V	SPEAKER	1
21	PQJE115Z	FLAT CABLE	1
22	PQHR9597Z	SPACER	1
23	PQSE119Z	KEY SWITCH	1
24	PQBCX216Y	BUTTON, MEMORY-B	1
25	PQBCX216Z	BUTTON, MEMORY-C	1
HANDSET PARTS			
H1	PQJX2PYL02Y	HANDSET ASSEMBLY	1
H1-1	PQKM211R87	LOWER CABINET	1
H1-2	PQKF192Y87	UPPER CABINET	1
H1-3	PQAX4P03Z	SPEAKER	1
H1-4	PQWMJ2PYC02Y	MICROPHONE ASS'Y	1
H1-5	PQJ1TB17X	JACK	S 1
H1-6	PQH32Y	WEIGHT	1
H1-7	PQH695W	RUBBER PARTS, CAP	2

Ref. No.	Part No.	Part Name & Description	Pcs
ACCESSORIES AND PACKING MATERIALS			
A1	PQJA214X	HANDSET CORD	1
A2	PQJA72X	TELEPHONE CORD	1
A3	PQOX6403Z	INSTRUCTION BOOK	1
A4	PQOX6404Z	INSTRUCTION BOOK (REFERENCE MANUAL)	1
P1	PQPK1213Z	GIFT BOX	1
P2	PQPN1198Z	CUSHION	1
P3	XZB15X25A01	PROTECTION COVER (FOR ACCESSORIES)	1
P4	XZB26X40A01	PROTECTION COVER (FOR UNIT)	1
P5	PQPH75Z	PROTECTION COVER (FOR HANDSET)	1
MAIN BOARD PARTS			
PCB1	PQWP1T7130X	MAIN BOARD ASS'Y (NLA)	1
(ICs)			
IC1	PQVISC77655S	IC	1
IC2	Not Used		
IC3,4	PQVITC4066BP	IC	S 2
IC5	PQVITC4011BP	IC	S 1
IC6	PQVIUM95089	IC	1
IC7	PQVI4046SA92	IC	1
IC8	PQVITC4017BP	IC	S 1
IC9	PQVITC7H42P	IC	S 1
IC10	PQVIUPC358C	IC	S 1
(TRANSISTORS)			
Q1	2SA1625	TRANSISTOR(SI)	S 1
Q2,3	2SD1819A	TRANSISTOR(SI)	S 2
Q4,5	PQVTFB1J3P	TRANSISTOR(SI)	2
Q6	PQVTDTA143XU	TRANSISTOR(SI)	1
Q7	2SD1819A	TRANSISTOR(SI)	S 1
Q8,9	PQVTBB1J3P	TRANSISTOR(SI)	2
Q10,11	2SD1819A	TRANSISTOR(SI)	S 2
Q12	PQVTDTC143E	TRANSISTOR(SI)	1
Q30	PQVTDTA143XU	TRANSISTOR(SI)	1
Q32,33	2SD1819A	TRANSISTOR(SI)	S 2
Q34	2SK117	TRANSISTOR(SI)	1
Q36,37	2SJ103	TRANSISTOR(SI)	2
Q101	2SB1218A	TRANSISTOR(SI)	S 1
Q102,103	2SD1819A	TRANSISTOR(SI)	S 2
Q110-120	2SD1819A	TRANSISTOR(SI)	S 11
Q121	PQVTDTC123E	TRANSISTOR(SI)	1
Q122-126	PQVTDTC143E	TRANSISTOR(SI)	5
Q203	2SD2136	TRANSISTOR(SI)	1
(DIODES)			
D1,2	PQVDS1YB40F1	DIODE(SI)	2
D3	1SS131	DIODE(SI)	1
D4	Not Used		
D5	1SS131	DIODE(SI)	1
D6	Not Used		1
D7	MA4068	DIODE(SI)	1
D90	1SS131	DIODE(SI)	1
D100	1SS131	DIODE(SI)	1
D101	Not Used		
D102,104-115	1SS131	DIODE(SI)	13
D117,118	1SS131	DIODE(SI)	2
D120	MA4039	DIODE(SI)	1
D135	1SS131	DIODE(SI)	1
(PHOTO ELECTRIC TRANSDUCER)			
PC1	PQVITLP627	PHOTO COUPLER	S 1
(SWITCHES)			
SW1	PQSS2A27Y	SWITCH, MEMORY	1
SW2	PQSS2A27Y	SWITCH, HANDSET/HANDSET	1
SW3	PQSS3A17Y	SWITCH, CONTRAST	1
SW4	PQSS3A17Y	SWITCH, RINGER	1
SW5	PQSS3A17Y	SWITCH, HANDSET VOLUME	1
HOOK SW	ESE14A211	SWITCH, HOOK	1


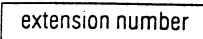


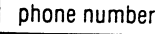

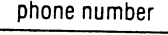

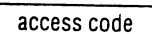


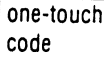
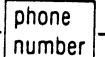


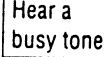

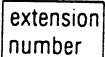
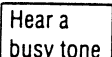




Ref. No.	Part No.	Part Name & Description	Pcs
T1	ETE13K24AY	(TRANSFORMERS)	1
T2,3	PQLT8D2A	PULSE TRANSFORMER COMMUNICATION TRANSFORMER S	2
VR1	PQVAL204B24A	(VARIABLE RESISTORS)	S 1
VR2	PQNB3A00B24M	VOLUME CONTROL, 20kΩ (B) SEMI-FIXED, 20kΩ (B) S	1
X1	PQVCX2500N9	(CRYSTAL OSCILLATOR & CERAMIC FILTER)	1
X2	PQVBT3.58G6	CRYSTAL OSCILLATOR CERAMIC FILTER	1
C1	Not Used	(CAPACITORS)	
C2	PQCUV1E104MD	0.1	1
C3	ECEA1CK101	100 S	1
C4	ECEA0JKS220	22	1
C5	PQCUV1E104MD	0.1	1
C6	PQCUV1E473MD	0.047	1
C7	Not Used		
C8	Not Used		
C9	Not Used		
C10	Not Used		
C11	ECEA1HKS100	10	1
C12	ECEA2CU010	10	1
C13	ECEA0JKS220	22	1
C14	Not Used		
C15	Not Used		
C16	Not Used		
C17	Not Used		
C18	ECUV1H683MD	0.068 S	1
C19	Not Used		
C20	PQCUV1C683MD	0.068	1
C21	ECEA1CKS470	47 S	1
C22	PQCUV1E104MD	0.1	1
C23	PQCUV1H153KB	0.015	1
C24	PQCUV1E473MD	0.047	1
C25	ECEA1HKS010	1	1
C26	ECEA1HKS4R7	4.7 S	1
C27	PQCUV1C683MD	0.068	1
C28	PQCUV1H153KB	0.015	1
C29	ECEA0JU102	1000	1
C30	ECEA1CK101	100 S	1
C31	ECEA1CKS470	47 S	1
C32	PQCUV1H333JC	0.033	1
C33	ECEA1CKS470	47 S	1
C34	PQCUV1C683MD	0.068	1
C35	ECEA1HKS4R7	4.7 S	1
C36	ECEA0JKS220	22	1
C37	PQCUV1H103KB	0.01	1
C39	PQCUV1E104MD	0.1	1
C40	PQCUV1E473MD	0.047	1
C41	ECUV1H104MD	0.1 S	1
C42	ECEA1HKS4R7	0.47	1
C43	ECEA1HKS010	1	1
C60	ECEA1CKS470	47 S	1
C61	PQCUV1H223KB	0.022	1
C62	PQCUV1E104MD	0.1	1
C63	PQCUV1E104MD	0.1	1
C64	PQCUV1E104MD	0.1	1
C65	ECEA0JU331	330	1
C66	PQCUV1H153KB	0.015	1
C67	Not Used		
C68	ECEA1HKS100	10	1
C69	PQCUV1E104MD	0.1	1
C70	PQCUV1H103KB	0.01	1
C71	PQCUV1E104MD	0.1	1
C72	PQCUV1E104MD	0.1	1
C73	PQCUV1E104MD	0.1	1
C80	ECEA1HKS2R2	2.2	1
C81	ECEA1HKS2R2	2.2	1
C83	PQCUV1E104MD	0.1	1
C84	ECEA1CK101	100 S	1





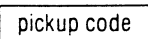







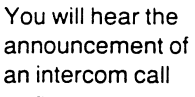
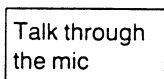
Ref. No.	Part No.	Part Name & Description (Value)	Pcs
C86	PQCUV1E104MD	0.1	1
C87	PQCUV1E104MD	0.1	1
C88	PQCUV1E104MD	0.1	1
C90	PQCUV1E104MD	0.1	1
C91	PQCUV1H152KB	0.0015	1
C92	PQCUV1E473MD	0.047	1
C93	ECEA1HKS4R7	4.7 S	1
C94	PQCUV1E104MD	0.1	1
C95	PQCUV1E104MD	0.1	1
C96	PQCUV1E104MD	0.1	1
C97	Not Used		
C98	Not Used		
C99	Not Used		
C100	PQCUV1H390JC	39P	1
C101	PQCUV1H390JC	39P	1
C102	PQCUV1H221JC	220P	1
C103	PQCUV1H221JC	220P	1
C104	PQCUV1H221JC	220P	1
C105	PQCUV1H103KB	0.01	1
C106	ECEA1HKS010	1	1
C107	ECEA0JU102	1000	1
C108	ECEA0JU102	1000	1
C109	PQCUV1H103KB	0.01	1
C110	PQCBC1H221KB	220P	1
C111	Not Used		
C112	PQCUV1H103KB	0.01	1
C140	PQCUV1H103KB	0.01	1
C141	ECEA1HKS100	10	1
C160	ECEA1HKS2R2	2.2	1
C161	PQCUV1H151JC	150P	1
C162	ECEA1CK101	100 S	1
C163	ECEA1HKS3R3	3.3 S	1
C164	ECEA0JU331	330	1
C170	ECEA1HKS4R7	4.7	1
C171	PQCUV1H153KB	0.015	1
C174	PQCUV1H682KB	0.0068	1
C175	PQCUV1H103KB	0.01	1
C201	ECEA1HKS010	1	1
R1	PQ4R10XJ470	47	1
R2	PQ4R10XJ393	39K	1
R3	Not Used		
R4	PQ4R10XJ122	1.2K	1
R5	PQ4R10XJ151	150	1
R6	PQ4R10XJ273	27K	1
R7	PQ4R10XJ330	33	1
R8	PQ4R10XJ221	220	1
R9	PQ4R10XJ102	1K	1
R10	PQ4R10XJ274	270K	1
R11	PQ4R10XJ332	3.3K	1
R12	PQ4R10XJ121	120	1
R13	PQ4R10XJ473	47K	1
R14	PQ4R10XJ222	2.2K	1
R15	Not Used		
R16	Not Used		
R17	Not Used		
R18	Not Used		
R19	Not Used		
R20	PQ4R10XJ225	2.2M	1
R21	PQ4R10XJ303	30K	1
R22	PQ4R10XJ683	68K	1
R23	PQ4R10XJ562	5.6K	1
R24	PQ4R10XJ275	2.7M	1
R25	PQ4R10XJ472	4.7K	1
R26	PQ4R18XJ104	100K	1
R27	PQ4R18XJ393	39K	1
R28	PQ4R10XJ152	1.5K	1
R29	PQ4R10XJ154	150K	1
R30	PQ4R10XJ222	2.2K	1
R31	PQ4R10XJ472	4.7K	1
R32	ERDS2TJ183	18K	1
R33	PQ4R10XJ103	10K	1

Ref. No.	Part No.	Part Name & Description (Value)	Pcs	Ref. No.	Part No.	Part Name & Description	Pcs
R34	Not Used			R140	Not Used		
R35	PQ4R18XJ3R3	3.3	1	R141	Not Used		
R36	PQ4R10XJ682	6.8K	1	R142	PQ4R10XJ223	22K	1
R60	PQ4R10XJ682	6.8K	1	R143	ERDS2TJ100	10	1
R61	PQ4R10XJ392	3.9K	1	R144	Not Used		
R62	PQ4R10XJ274	270K	1	R145	Not Used		
R63	PQ4R10XJ101	100	1	R146	Not Used		
R64	PQ4R10XJ471	470	1	R147	Not Used		
R65	PQ4R10XJ222	2.2K	1	R148	Not Used		
R66	PQ4R10XJ563	56K	1	R149	Not Used		
R67	PQ4R10XJ471	470	1	R150	PQ4R10XJ472	4.7K	1
R68	PQ4R10XJ682	6.8K	1	R151	PQ4R10XJ103	10K	1
R69	PQ4R10XJ183	18K	1	R152	PQ4R10XJ103	10K	1
R70	PQ4R10XJ272	2.7k	1	R153	PQ4R10XJ392	3.9K	1
R71	PQ4R10XJ274	270K	1	R154	Not Used		
R72	PQ4R10XJ101	100	1	R155	Not Used		
R73	PQ4R10XJ224	220K	1	R156	Not Used		
R74	PQ4R10XJ102	1K	1	R157	Not Used		
R75	PQ4R10XJ224	220K	1	R158	Not Used		
R76	PQ4R10XJ473	47K	1	R159	Not Used		
R77	PQ4R10XJ470	47	1	R160	PQ4R10XJ472	4.7K	1
R78	PQ4R10XJ154	150K	1	R161	PQ4R10XJ472	4.7K	1
R79	PQ4R10XJ473	47K	1	R162	PQ4R10XJ103	10K	1
R80	PQ4R10XJ123	12K	1	R163	PQ4R10XJ103	10K	1
R81	PQ4R10XJ472	4.7K	1	R164	PQ4R10XJ102	1K	1
R89	PQ4R10XJ103	10K	1	R165	PQ4R10XJ101	100	1
R90	PQ4R10XJ222	2.2K	1	R166	PQ4R10XJ222	2.2K	1
R91	PQ4R10XJ394	390K	1	R167	PQ4R10XJ472	4.7K	1
R92	Not Used			R168	Not Used		
R93	PQ4R10XJ103	10K	1	R169	Not Used		
R94	PQ4R10XJ104	100K	1	R170	Not Used		
R95	PQ4R10XJ562	5.6K	1	R171	PQ4R10XJ223	22k	1
R96	PQ4R10XJ183	18K	1	R172	PQ4R10XJ223	22k	1
R97	PQ4R10XJ103	10K	1	R173	PQ4R10XJ223	22k	1
R98	PQ4R10XJ103	10K	1	R174	PQ4R10XJ223	22k	1
R99	PQ4R10XJ104	100K	1	R175	PQ4R10XJ223	22k	1
R100	PQ4R10XJ182	1.8K	1	R176	Not Used		
R101	Not Used			R177	Not Used		
R102	Not Used			R178	Not Used		
R103	Not Used			R179	Not Used		
R104	Not Used			R180	PQ4R10XJ332	3.3K	1
R105	Not Used			R181	PQ4R10XJ272	2.7K	1
R106	Not Used			R182	PQ4R10XJ182	1.8K	1
R107	PQ4R10XJ222	2.2K	1	R183	PQ4R10XJ223	22K	1
R108	Not Used			R184	Not Used		
R109	PQ4R18XJ102	1K	1	R185	Not Used		
R110	PQ4R10XJ564	560K	1	R186	Not Used		
R111	PQ4R18XJ102	1K	1	R187	Not Used		
R112	PQ4R10XJ105	1M	1	R188	PQ4R10XJ104	100K	1
R113	ERDS2TJ102	1K	1	R189	Not Used		
R114	ERDS2TJ102	1K	1	R190	PQ4R10XJ102	1K	1
R115	ERDS2TJ102	1K	1	R191	PQ4R10XJ822	8.2K	1
R116	ERDS2TJ102	1K	1	R192	Not Used		
R117	ERDS2TJ102	1K	1	R193	PQ4R10XJ100	10	1
R118	PQ4R10XJ102	1K	1	R194	PQ4R10XJ104	100K	1
R119	PQ4R10XJ102	1K	1	R195	PQ4R10XJ330	33	1
R120	PQ4R10XJ102	1K	1	R200	PQ4R10XJ102	1K	1
R121	PQ4R10XJ102	1K	1	R201	Not Used		
R122	ERDS2TJ102	1K	1	R202	PQ4R10XJ222	2.2K	1
R123	PQ4R10XJ102	1K	1	R203	PQ4R10XJ274	270K	1
R124	PQ4R10XJ102	1K	1	R204	PQ4R10XJ332	3.3K	1
R125	PQ4R10XJ181	180	1	R205	PQ4R10XJ181	180	1
R126	PQ4R10XJ181	180	1	R206	PQ4R10XJ151	150	1
R127	PQ4R10XJ680	68	1	R207	PQ4R10XJ221	220	1
R128	PQ4R10XJ330	33	1	R208	PQ4R10XJ333	33K	1
R129	PQ4R10XJ820	82	1	R209	PQ4R10XJ102	1K	1
R130	PQ4R10XJ330	33	1	R210	PQ4R10XJ473	47K	1
R131	PQ4R10XJ820	82	1	R211	PQ4R10XJ223	22K	1
R132	PQ4R10XJ330	33	1	R212	PQ4R10XJ183	18K	1
R133	PQ4R10XJ820	82	1	R213	PQ4R10XJ473	47K	1
R134	PQ4R10XJ330	33	1	R220	PQ4R10XJ221	220	1
R135	PQ4R10XJ820	82	1	R221	PQ4R10XJ474	470K	1
R136	Not Used			R222	PQ4R10XJ224	220K	1
R137	Not Used			R223	PQ4R10XJ224	220K	1
R138	Not Used			R230	PQ4R10XJ332	3.3K	1
R139	Not Used						

Ref. No.	Part No.	Part Name & Description	Pcs
CN3	PQJS10X54Z	(CONNECTORS & JACKS) CONNECTOR, 10P	1
CN6-9	PQJP8D113Z	CONNECTOR, 8P	4
HS	PQJ1TB2T	JACK, HANDSET S	1
JACK			
TEL	PQJ1TC5Z	JACK, EMSS	1
JACK			
E1	RJM142Z	(OTHERS) MICROPHONE S	1
E2	PQHG503Z	RUBBER PARTS, MIC COVER	1
OPERATION BOARD PARTS			
PCB2	PQWP2T7130X	OPERATION BOARD ASS'Y (NLA)	1
		(DIODES)	
D617-621	LN1261C	LED	5
D622	LN1361C	LED	1
D623-634	LN2162C13TR	LED	12
D635	LN1261C	LED	1
CN1-4	PQJS8B30Z	(CONNECTOR) CONNECTOR, 8P	4
LCD BOARD PARTS			
PCB3	PQWP3T7130X	LCD BOARD ASS'Y (NLA)	1
IC601	PQVIHD44780	(IC) IC	1
		(RESISTORS)	
R601	PQ4R10XJ152	1.5K	1
R602	PQ4R10XJ152	1.5K	1
R603	PQ4R10XJ152	1.5K	1
R604	PQ4R10XJ152	1.5K	1
R605	PQ4R10XJ152	1.5K	1
R606	PQ4R18XF9092	90.9K	1
LCD601	PQADLF7192G6	(OTHERS) LIQUID CRYSTAL DISPLAY S	1
CN601	PQJS10X53Z	CONNECTOR, 10P	1
E601	PQSE121Z	CONNECTOR, LCD	2
E602	PQHR9567Z	GUIDE, LCD	1

OPERATIONS

Making Calls		
Press the  button or lift the handset first.		
Feature		Operation
Inter Office Calling	Station to station dialing within the system.	 or 
Individual Line Access	Any CO line can be directly selected.	 → 
Automatic Line Access	An idle CO line will be automatically selected.	 → 
System Speed Dialing	Any extension users can make an outside call with a simple operation.	 → 
One-Touch Dialing	A system feature or a telephone number can be activated with simply pressing the Programmable Feature button programmed in advance.	Dialing: 
		Programming: Set the memory switch to "PROGRAM".  →  →  →  Replace the memory switch to the "SET".
When a Line is Busy		
Automatic Call Back Busy (Camp-on)	This feature automatically notifies you when the busy CO line or extension becomes free.	Outside Calls:  →  → 
		Intercom Calls:  →  → 
Redial	The last dialed number will be redialed at one touch. • Automatic redial can work in upgraded systems.	 or  → 

Receiving Calls		
Feature		Operation
Answer	Answering the incoming calls.	 or 
Automatic Answer—Intercom	The extension user can answer an intercom call in the automatic hands-free mode.	Setting:  The indicator lights in red.
		Canceling:  The indicator goes out.
Dial Call Pickup	An extension user can answer any ringing extension within their own extension group.	 •The pickup code depends on the EMSS Control Unit.
While Having a Conversation		
Hold—CO Line	An outside call will be put on hold during a conversation.	 The CO line indicator flashes in green. Other extensions flash in red.
		Retrieving:  The indicator lights in green.
		Retrieving from another extension:  The indicator lights in green.
Hold—Intercom	An intercom call will be put on hold during a conversation.	 The intercom indicator flashes in green.
		Retrieving:  The indicator lights in green.
Call Transfer to Extension	An outside call or an intercom call will be transferred to any extension.	Transferring after the other extension answers:  → extension number → Wait for an answer and announce → Hang up
		Transferring without announcing to the other extension:  → extension number → Hang up
OHCA (Off Hook Call Announcement)	This feature allows a user to receive an intercom call through the speaker while off-hook on another call.	 → 

For further details, please refer to the Electronic Modular Switching System (EMSS) Control Unit Manual.

Service Manual

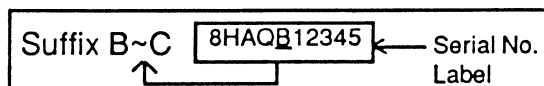
Supplement-1

and Technical Guide

PROPRIETARY TELEPHONE FOR
ELECTRONIC MODULAR SWITCHING SYSTEM**KX-T7130****KX-T7130-B**

• Please use this manual together with the service manual for model No. KX-T7130, order No. KM49106657A1 and KX-T7130-B, order No. KM49205116A1.

CHANGES



■ KX-T7130

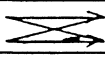
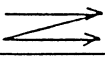
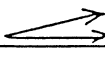
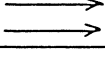
No.	Suffix	Reason for suffix change
1	A → B	To change the fixed number of tone detector circuit.
2	B → C	To change the cabinet to prevent buttons clinging to edge.

■ KX-T7130-B

No.	Suffix	Reason for suffix change
1	A → B	To change the upper cabinet and the handset to coat on surface.

Panasonic

■ PARTS COMPARISON TABLE

Reason for Change		*The circled item indicates the reason. If no marking, see the Notes in the bottom column.		
1. Improve performance				
2. Change of material or dimension				
3. To meet approved specification				
4. Standardization				
5. Addition				
6. Deletion				
7. Correction (From the first production)				
8. Other				
Interchangeability Code		**The circled item Indicates the interchangeability. If no marking, see the Notes in the bottom column.		
Parts	Set Production			
A	Original New		Early Late	Original or new parts may be used in early or late production set. Use original parts until exhausted, then stock new parts.
B	Original New		Early Late	Original parts may be used in early production sets only. New parts may be used in early or production sets. Use original parts where possible, then stock new parts.
C	Original New		Early Late	New parts only may be used in early or late production sets. Stock new parts.
D	Original New		Early Late	Original parts may be used in early production sets only. New parts may be used in late production sets only. Stock both original and new parts.
E	Other			
Part Number				

■ PARTS COMPARISON TABLE (KX-T7130)

Ref. No.	Original Part No.	New Part No.	Part Name & Description	Pcs/Set	Remarks	Notes	Time of change (Suffix)
CABINET AND ELECTRICAL PARTS							
1	PQKM209Z81	PQKM209X81	Upper Cabinet	1		1 B	C
6	PQBD166Y1	PQBD166X1	Kob, Volume	1		1 B	
11	PQHP5119Z1	PQGD10019Z1	TEL. No. Card (Large)	1		8 A	
13	PQHP5118Z	PQGD10006Z	Overlay	1		8 A	
15	PQHR5393Z	PQHR5393Y	Transparent Plate [TEL No. Card (Large)]	1		1 B	
17	PQHR9565Z1	PQHR9565Y1	Cover, Memory Card	1		1 C	
MAIN BOARD PARTS							
R89	PQ4R10XJ103	PQ4R10XJ822	Resistor, 8.2kΩ	1		1 B	B
R90	PQ4R10XJ222	PQ4R10XJ822	Resistor, 8.2kΩ	1		1 B	B
Q12	PQVTDTC143E	PQVTDTC144E	Transistor (SI)	1		1 B	B

■ PARTS COMPARISON TABLE (KX-T7130-B)

Ref. No.	Original Part No.	New Part No.	Part Name & Description	Pcs/Set	Remarks	Notes	Time of change (Suffix)
CABINET AND ELECTRICAL PARTS							
1	PQKM209Z8	PQKM209Y0	Upper Cabinet	1		1 B	B
HANDSET PARTS							
H1	PQJX2PM407Z or PQJX2PM408Z	PQJX2PM409Z (Can't be assembled)	Handset Ass'y	1		1 B	B

Service Manual

Simplified

and Technical Guide

PROPRIETARY TELEPHONE FOR
ELECTRONIC MODULAR SWITCHING SYSTEM

KX-T7130

(for U.S.A.)

Please use this manual together with the service manual for model No. KX-T7130, order No. KM49105626C3.
This Service Manual indicates the main differences between; Original KX-T7130 and KX-T7130 for U.S.A.

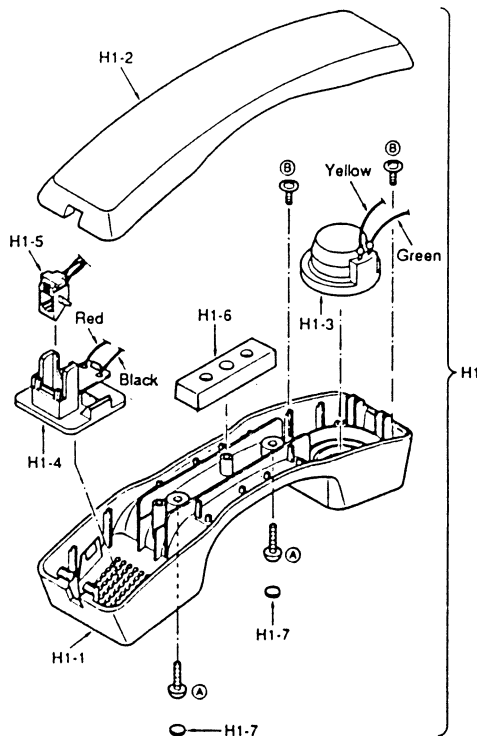
■ PARTS COMPARISON TABLE

Ref. No.	Part No.		Part Name & Description	Pcs/ Set	Remarks
	KX-T7130 (Original)	KX-T7130 (for U.S.A.)			
Cabinet and Electrical Parts					
1	PQKM209Z8	PQKM209Z81	Upper Cabinet	1	
2	PQBCX198Z	PQBCX218Z	Button, DIAL/REDIAL/FLASH	1	
3	PQBCX199Z	PQBCX199Z1	Button, TRANS/PAUSE/AUTO etc.	1	
4	PQBCX215Z	PQBCX215Z1	Button, INTERCOM/CONF etc.	4	
6	PQBD166Z	PQBD166Y1	Knob, Volume	1	
7	PQBE37Z	PQBE37Z1	Button, HOOK	1	
8	PQGG91Z	PQGG91Z1	Grille	1	
9	PQGP130Z	PQGP130Z1	LCD Panel	1	
10	PQKE82Z	PQKE82Y	Hanger	1	
11	PQHP5119Z	PQHP5119Z1	TEL. NO. Card (Large)	1	
17	PQHR9565Z	PQHR9565Z1	Cover, Memory Card	1	
18	PQYFT7130X8	PQYF7130M81U	Lower Cabinet Ass'y	1	
19	PQYLT7030X8	PQYL7030M81U	Stand Ass'y	1	
24	PQBCX216Y	PQBCX216Y1	Button, Memory-B	1	
25	PQBCX216Z	PQBCX216Z1	Button, Memory-C	1	
Handset Parts					
H1	PQJX2PYL02Y	PQJX2PS407Z or PQJX2PS408Z	Handset Ass'y	1	
H1-1	PQKM211R87	PQKM121K85	Lower Cabinet	1	
H1-2	PQKF192Y87	PQKF104Z85	Upper Cabinet	1	
H1-3	PQAX4P03Z	PQAX4P03Y	Speaker	1	
H1-4	PQWMJ2PYL02Y	PQWMJX403Z	Microphone Ass'y	1	
H1-5	PQJJ1TB17X	-----	Jack	0	Deletion
H1-6	PQHM32Y	PQHM67Z	Weight	1	
H1-7	PQHG695W	PQHG695X	Rubber Parts, Cap	2	
Accessories and Packing Materials					
A1	PQJA214X	PQJA214Y	Handset Cord	1	
A3	PQOX6403Z	PQOX6429Z	Instruction Book	1	
A4	PQOX6404Z	PQOX6430Z	Instruction Book (Reference Manual)	1	
P1	PQPK1213Z	PQPK1418Z	Gift Box	1	
P2	PQPN1198Z	PQPN1228Z	Cushion	1	
Main Board Parts					
PCB1	PQWP1T7130X	PQWP1T7130MU	Main Board Ass'y (NLA)	1	
IC6	PQVIUM95089	PQVITP5089N	IC	1	
X2	PQVBT3.58G6	PQVBT3.58G4	Ceramic Filter	1	S
C4	ECEA0JKS220	ECEA1HKS100	Capacitor, 10μF	1	
C68	ECEA1HKS100	ECEA1CKS470	Capacitor, 47μF	1	
R4	PQ4R10XJ122	PQ4R10XJ102	Resistor, 1kΩ	1	
R8	PQ4R10XJ221	PQ4R10XJ101	Resistor, 100Ω	1	
R63	PQ4R10XJ101	PQ4R10XJ221	Resistor, 220Ω	1	

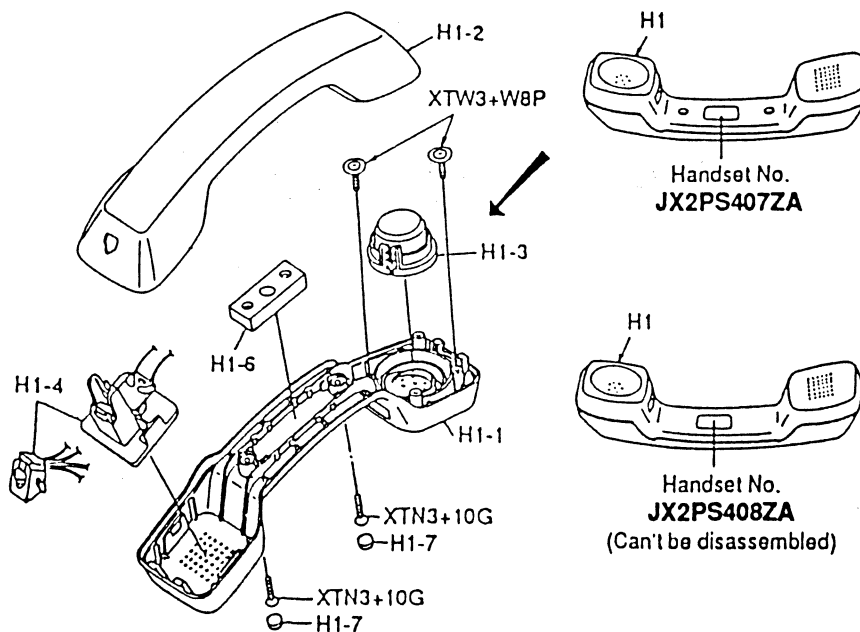
Panasonic

Ref. No.	Part No.		Part Name & Description	Pcs/ Set	Remarks
	KX-T7130 (Original)	KX-T7130 (for U.S.A.)			
R65	PQ4R10XJ222	PQ4R10XJ152	Resistor, 1.5k Ω	1	
R68	PQ4R10XJ682	PQ4R10XJ103	Resistor, 10k Ω	1	
R69	PQ4R10XJ183	PQ4R10XJ273	Resistor, 27k Ω	1	
Operation Board Parts					
PCB2	PQWP2T7130X	PQWP2T7130MU	Operation Board Ass'y (NLA)	1	
LCD Board Parts					
PCB3	PQWP3T7130X	PQWP3T7130MU	LCD Board Ass'y (NLA)	1	

■ HANDSET PARTS LOCATION



[KX-T7130 (Original)]



(KX-T7130 for U.S.A.)

Earpiece Speaker

